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Thesis

METHODS AND MATERIALS FOR MOTIVATING SLOW SEVENTH GRADE STUDENTS IN SOCIAL STUDIES

Submitted by

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(A.B., Bates, 1941)

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CHAPTER I

INTRODUCTION

DEFINITION OF THE PROBLEM

The purpose of this paper will be to propose a series of those activities of students which can prove to be beneficial to the acquisition of knowledge and understandings, but which will not require a normal reading ability. Due to the pronounced emphasis of reading as an essential skill in the pursuance of social studies, these methods and materials will help to compensate for a deficiency in reading skills. In view of the tremendous problem of presenting many and varied methods and materials for the motivation of students in social studies, the author has deemed it advisable to confine his writings to those seventh grade classes where social geography is taught.

These methods suggested will require a wider range of activities on the part of the students than is normally carried on in classrooms. By so doing, these methods will provide for individual differences on another basis than how well the students have learned their fundamental skills. First of all, these methods will project the student into a more real, life-like situation from which he will gain more valuable experience than that achieved in the too nebulous classroom work.

These methods will be a useful way in which to appeal to the interests of the students, and since this interest is vital to motivation, the students can be stimulated to do more. By the direction of the skillful teacher, the students will move from that which is interesting and real to them, into the realm of vague concepts and intangible phenomona. Also by utilizing interest, the students will be provoked into a wider participation in the routine of the classroom because they will be able to compete with the fast learners. This will give the slow students a vital feeling of success.

The opportunity offered by these methods will give the students the opportunity to evaluate their work and to acquire a sense of accomplishment which is essential to motivation. It is not merely the achievement of the established goal, but also the satisfaction of building, developing or enlarging upon an undertaking which will produce the desired results.

> Learning always takes place as a result of the organism accomplishing something. The responses which are successful are learned. The motivation of the organism is reduced when the successful response occurs. The condition of being motivated is always produced by some factor other than the mere solution of the problem.[1]

These methods also provide an opportunity for crossing the departmental divisions in school so that the student's

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[1]William G. Spalding and William C. Kvaraceus, "Making the School More Effective through a Basic Consideration of Motives," Harvard Educational Review 13:238 May, 1943.

formal education takes on the appearance of an integrated whole rather than a series of unrelated events in the day's program. There will be an opportunity to relate the work in other subjects to the efforts expended in the social studies class.

Finally these methods will be able to demonstrate that intangible and often forgotten entity in education, the modification of behavior. The teacher will be able to determine from the student's industry and devotion to his activity, the extent to which the student's behavior is or has been changed.

Along with these advantages of the proposed methods of motivating the students there are some outstanding dangers which should be mentioned. There is no real and adequate substitute for such a basic skill as reading, and to propose that such a substitute were possible would be a fallacious contention. Therefore this use of "projects" in which the student participates should not be misconstrued as a solution for the inadequacy of student skills. Rather the proposition is that the teacher will be able to provide for the situation as it actually exists and make the most of it.

Also there is the danger of too much time and effort being devoted to the activity with the result that the energy consumed retards the student from reaching his goal; the student will have missed the basic concept through an over-indulgence in the development of the activity.

The requirement of a skillful teacher with a wide experience and a fertile ingenuity could also be a pitfall in using the methods offered. It would be important for the teacher to select the work judiciously lest it consume too much time for the accomplishments which are expected. The teacher must consider the needs of the individual students and adjust the program accordingly.

In spite of these dangers, the author contends that the use of these suggested methods provides a positive means of motivating students. At least provisions will be made for the slow learners and it is doubtful that the faster students would suffer or be deterred by such a program.

THE CLARIFICATION OF TERMS

In order to avoid confusion it seems appropriate to incorporate the definitions of the terms which are used in the topic of this service paper. It is felt that by so doing the reader will have a more concrete basis for understanding the objectives of the author.

The definition of the word "method" has been subject to much conjecture in the field of education, but one of the more substantial ones offered comes from Edgar B. Wesley.

> In education the word 'method' is used to indicate a series of teacher directed activities that result in learning by the pupils. Method may be regarded as the process or procedure whose successful completion results in learning, or as

a means through which teaching becomes effective.[2]

The next word is "materials" and although there is a great variety of interpretations, the following is suitable for this paper: Materials, in the social studies, will consist of those substances other than the regular classroom furnishings and utensils which may be employed by the pupils or the teacher in their educational endeavors.

After this comes the much discussed term "motivation." The following definition was selected because it expresses adequately the thoughts of the writer.

> Motivation--the application of the use of incentives whether external or internal, for the purpose of causing a pupil or student to perform in a desired way; usually designates the act of choosing study materials of such a sort and presenting them in such a way as to appeal to the pupil's interests and cause him to attack the work at hand willingly and to complete it with sustained enthusiasm: also designates the use of various devices, such as offering rewards or an appeal to the desire to excel.[3]

Finally there is the term "slow pupil" which may be substituted for slow student as it is used in this service paper.

> An exceptional pupil who thinks, acts or moves more slowly than most children and who makes slow progress in school; may be a plodder or a sluggard.[4]

To enlarge upon this definition, the author feels that the term "slow pupil" should not be applied solely to the student

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[2]Edgar B. Wesley, Teaching the Social Studies (Boston: D. C. Heath and Company 1942), p. 445.

[3]Carter V. Good, Dictionary of Education, (New York: McGraw-Hill Book Company Inc., 1945), p. 206.

[4]Ibid. p. 321

who is mentally retarded. Rather it should be used when referring to the student who is not working up to his capacity as measured by the standards accepted by the school of which he is a part.

The student may be working below his capabilities because of a lack of understanding, of interest, or of proper motivation which is the responsibility of the teacher. In other words, the student should be designated a retarded student, not a slow one, when he has demonstrated retardation after every opportunity has been offered to him.

REASONS FOR GRADE LEVEL RESTRICTION

According to Edgar B. Wesley the most frequent social studies programs offered at the seventh grade level include "American History, civics, geography of United States, social studies."[5] With these main topics in the offing, it can be readily seen that there are innumerable opportunities for the use of motivating methods in the classroom.

In conjunction with the topics taught, there are other factors which must be considered as an explanation of the grade level restriction. First, the writer is at present teaching in the seventh grade and there is an opportunity for experimenting with and evaluating the suggested methods. With this

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[5]Edgar B. Wesley, Teaching the Social Studies, (Boston: D. C. Heath and Company 1942), p. 49.

background of actual classroom use, the methods and materials will be more reliable; they will be of greater value for any subsequent reader of this paper.

There are certain psychological principles upon which this material must be and is based. It is generally conceded that students of the seventh grade are at an age when activity is essential. Having just left the elementary level, where much of their program has consisted of a series of active projects, where they were permitted a greater amount of freedom, and where the child's capabilities are developed as fully as possible, the child is provided with an easier means of transition into the junior high school level. In the elementary schools the students have participated in numerous activities which involve drawing, painting, collecting and other such beneficial types of work.

It is psychologically sound to proceed from the known to the unknown and at the seventh grade level, the students are constantly referring to their previous experiences. Therefore the teacher should capitalize on this characteristic and utilize the known experiences as a starting point for the unknown to be experienced.

It is common knowledge that the attention span of seventh grade students is relatively short and that the teacher should take this factor into account. Mere formal class routine is insufficient for the complete provision for all students. Quite often the students are unfamiliar with the departmentali-

zation program and there is difficulty in maintaining the necessary attention over the time allotted for the subject.

Then too, the use of certain activities, particularly those involving construction, will give tangible goals to the students; the materials being near at hand keeps the task within the child's view, and sustained attention is maintained. When a child does not understand, when the material being studied is completely outside the realm of his experiences, there is a need for a variety of stimuli or the attention span will be even shorter. Whenever possible, there should be alternative activities which will provide a change. Throughout this use of manual activities for the motivation of learning there is the irrefutable fact that the definiteness of the material, the concreteness of the work and its products are a guarantee of understanding.

The student's interest must be maintained to assure some learning which in turn will insure some form of mental or physical activity. When the child is working in a medium with which he is familiar, intrinsic interest will result and there is a further guarantee of motivation. When the child is working with concrete materials, many associations will be possible. With both the immediate goal, the task to be accomplished, and the final goal, the utility of the product, a good emotional attitude will be maintained toward the work being done. Finally, the provision for a possible change, the prospect of opportunities for working on the projects of interest to the students,

will help to make the more tedious work more palatable.

Success is essential for the seventh grader because he has newly embarked on a type of school life which is different from that which he has previously experienced. Therefore there should be some opportunity, which may not be found in ordinary classwork, by which the student can achieve some measure of success. The child needs this social success which can be acquired in the form of approval, companionship, and prestige. Also, since the teacher must have some basis for his approval, the student should produce something worth praising. Oral expression by the students may not be sufficient to supply this basis for praise. Consequently the evaluation of some product of the student's activity provides a more substantial factor on which the teacher can bestow his praise.

The question of maturity should not be forgotten when this proposed program is considered. By the time the student has arrived at the seventh grade he has achieved some measure of sophistication. He realizes that he has been promoted from the elementary level and must therefore be prepared to assume greater responsibility. Why not take advantage of this situation? The student also has achieved some mastery of the basic study skills and although they should not be forgotten, he should be provided with other outlets for his energies. From the observations of the writer it is evident that the students are at the collecting age. Stamps, postmarks, buttons, match covers, etc. are the usual treasures that are hoarded.

This characteristic should be used to the student's advantage in his social studies work. Let him collect those materials which will help to enrich his class work. It has also been observed that many of the students have interests in model making. Here again the tendency should be redirected to aid the student in his school program.

Undoubtedly a large percentage of seventh grade students have a desire to draw. When this condition prevails, the teacher should capitalize upon it and provide numerous opportunities for his charges to exercise these talents. As before, this observation comes from the writer's experience, but the validity of such a contention has been established to his satisfaction.

PHILOSOPHICAL BACKGROUND

Much of the background for this thesis lies in the writings and practices of the exponents of the Activity Movement. Due to the multitude of people involved and for the sake of brevity, this chapter will be limited to the American precursors of our present day activity programs. Although the European influence will be seldom mentioned, we must acknowledge the importance of such men as Rousseau, Basedow, and Pestalozzi for their contributions to the fundamental concepts of activity as the basis for learning. Rousseau emphasized interest, Basedow believed in realistic instruction and Pestalozzi proposed that education can be accomplished through

self activity. The originality and foresight of these men had a great effect on education and in particular upon our American leaders.

Yet we must not lose sight of the uniqueness of our American educational system. Because of this outstanding fact, the American leaders should be considered and investigated more thoroughly. The thinking of our own educational leaders has contributed more to our own school programs, and therefore they will have a greater influence on the results of this thesis. Through the efforts of these people, much that was European was combined and modified to fit our problems.

Each of these leaders has provided the inspiration for others, and they have supplied the fund of diverse ideas from which we have gleaned the best. Undoubtedly their greatest contributions lie in their emphasis on the interests of the child and how best they can be provided for.

William Maclure (1763-1840) was the first American disciple of Pestalozzi.[6] From his interest in education, he was moved to try to establish a school based on Pestolozzian principles. His efforts at New Harmony, Indiana, were unsuccessful but he was instrumental in introducing Joseph Neef, one of Pestalozzi's foremost disciples, to the American scene. Throughout his life, Maclure was devoted to the improvement of American education, and his efforts should be recognized

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[6]Will S. Monroe, History of the Pestalozzian Movement in the United States, (Syracuse; C. W. Bardeen, 1907), p. 40.

although he achieved no substantial results.

Joseph Neef (1770-1854). His methods were rather unique for his time since he placed reading after the oral technique of teaching. Geometry was taught by objects, grammar was taught by usage, and the entire program was based on the child's interests. In the case of geography, those phenomena close to home were studied first.[7] As this was carried over to the work of New Harmony, the materials for study were collected from the locality. In spite of the fact that boys and girls were taught in separate schools, they learned the same academic subjects and appropriate trades.

Had Joseph Neef remained in one place for a more reasonable length of time, his influence might have been greater. He also failed to train teachers who could carry on his work. Besides, he was so far in advance of his times that his philosophy was wholly unacceptable to the public of the nineteenth century. Had he been able to interest some wealthy people in his program, he might have been able to promote his school with a greater measure of success.

Samuel Read Hall (1795-1877) was influential in promoting the educational philosophy which bases the school work on the child's interests. Although Hall did not work directly with students, his teacher training programs were effective in per-

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[7] Monroe, The Pestalozzian Movement, p. 100.

petuating his philosophy.[8]

Amos Bronson Alcott (1799-1888) was a contemporary of Samuel Read Hall, and Alcott too was interested in modifying the teaching techniques of his time. Although he had only a superficial understanding of the psychology of play, he did affect the type of curriculum of his day.[9] He firmly believed in his Masonic Temple school in Boston, Massachusetts, which was based on the motivation of interest, self government, the development of curiosity and interest, and the use of the conversational method and free play.[10]

Edward A. Sheldon (1823-1897) was perhaps the first man to convert a whole school system to a more progressive form of education. At Oswego, New York, under his direction, the curriculum was centered on the child's immediate environment, and by 1860 the emphasis shifted to teaching by objects. Margaret E. Jones of the Home and Colonial Training School at Gray's Inn Road, London, joined Sheldon; she specialized in the new mode of object teaching.[11]

Sheldon supported object teaching because he felt that

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[8]Thomas Woody, The Activity Movement, (Thirty-third Yearbook, National Society for the Study of Education, Part II, 1934), p. 19.

[9]George E. Haefner, A Critical Estimate of the Educational Theories and Practices of A. Bronson Alcott, (Camden: Haddon Craftsmen Inc., 1937), p. 125-126.

[10]Woody, The Activity Movement op. cit. p. 20.

[11]Monroe, op. cit. p. 178.

learning should proceed from perception to reasoning and developing exact language through the creation of definite ideas. Ned Dearborn, in his evaluation of the Oswego Movement, established certain principles from Sheldon's work upon which object teaching was based.

1. Begin with the senses.
2. Activity is a law of childhood. Train the child not merely to listen but to do. Educate the hand.
3. Love of variety is a law of childhood. Change is rest.
4. Reduce every subject to its elements and present one difficulty at a time.
5. Proceed step by step. The measure of information is not what you can give, but what the child can receive.
6. Let every lesson have a definite point.
7. Proceed from simple to difficult i.e. from the known to the unknown, from particular to general, from concrete to abstract.[12]

Disregarding the fact that Sheldon's psychology was based on the faculty theory, his contributions to object teaching have been helpful in crystallizing the thoughts of educators who followed. His ambition and devotion to his principles have left their mark on the basic concepts of the activity movement in the United States.

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[12]Ned H. Dearborn, The Oswego Movement in American Education, (New York: Teachers College, Columbia University, 1925), p. 69.

Francis W. Parker (1837-1902) while superintendent of schools at Quincy, Massachusetts, promoted his Doctrine of Concentration which was based on the practices of Comenius, Herbart, Froebel, Ziller, Stoy, and Rein.[13] Parker advocated that "the school room become a pleasant place of varied activity, combining discussion and manual work with Art and dramatics."[14] His method was based on the experience of the child, who drew and discussed the local environment until it became a part of the child's knowledge. From the local area, Parker proceeded to teach the integral parts of the continents. When the basic land forms had been learned, Parker emphasized the activities of people through an investigation of food (vegetation), animals, mines and quarries, and the reasons for establishing certain cities.[15]

Parker is best known for his Doctrine of Concentration and from it we have his basic contribution to educational thought. Fundamentally he believes in adapting the subjects to the needs of the students. It is quite evident that Parker also believed

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[13]Edwin R. A. Seligman, Encyclopedia of the Social Sciences Vol. II, (New York: MacMillan Company, 1933), p. 580.

[14]Ibid: p. 580.

[15]Francis W. Parker, Notes of Talks on Teaching, (Reported by L. E. Patridge; New York: E. L. Kellogg and Co., 1883), p, 137.

in a variety of modes of self expression beyond the usual classroom recitation. His feeling was that the complete learning process is dependent upon more than the mere acquisition of facts; that the whole educative process requires a multitude of activities which will consumate the act of learning.[16]

William James (1842-1910). Although he was mostly concerned with the higher levels of education, he helped to popularize the Herbartian Movement in the United States. James had only a secondary interest in education (philosophy and psychology being foremost) but his fame was instrumental in providing an authoritative background for what he said about education.

As B. J. Baldwin points out:

> What is being done with children in schools today, by way of letting the order of subject and methods of teaching follow the lead of the native activities and interests, is, in part, the outcome of his influence.[17]

And as the James influence applies to this paper, Baldwin says:

> Some of the direct changes wrought by James' treatment of instinct have been an enrichment of the course of study, giving an opportunity for an appeal to the various instincts as they appear at different stages of the child's life--a decided

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[16] Francis W. Parker, Talks on Pedagogics, (Edited by E. A. Whygaut and F. J. Cooke; New York: The John Day Company, 1937), p. 289.

[17] Bird J. Baldwin, "William James' Contributions to Education," The Journal of Educational Psychology, 2: 375, August, 1911.

> increase of emphasis on play and the wise use of the collecting instinct in geography, history, and other subjects; the significance of manual arts.[18]

G. Stanley Hall (1844-1924) is mentioned here because of his intensive and extensive work on the child development studies of the 1900's. His prolific writings for this movement and in the field of educational psychology permeated the thinking of later educators. Hall put a great emphasis on the essential qualities of children and the relation of these qualities to the educational program. At one point he expounds on the necessity for providing for manual activities in the school program.

> I believe that in few departments are current educational theories and practices so hard on geniuses for a season, very brief for most, prolonged for some, and permanent for the best. We do not know how to teach to see, hear, and feel when the sense centers are most indelibly impressible, and to give relative rest to the hand during the years when its power of accuracy is abated and when all that is good is idealized farthest and confidence in ability to produce is at its lowest ebb.[19]

Charles A. Mc Murry (1857-1929) worked closely with Frank McMurry (1862-1936) but this paper will be mostly concerned

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[18] Ibid. p. 376.

[19] G. Stanley Hall, Youth Its Education, Regimen and Hygiene, (New York: D. Appleton and Co., 1926), p. 52.

with the former. Undoubtedly Charles McMurry had a greater influence on the use of child activities in schools than any person mentioned thus far. Most of his efforts were devoted to the project method, and at certain points he makes allusions to geography teaching. Therefore the following facts taken from his writings are those which will have some bearing on the use of activities in the teaching of geography.

To begin with, he felt that "educationally considered, we believe a child is at his best when planning and executing his own projects or at least those which engage his full powers."[20] McMurry believed the project to be a natural attraction for the child's ambitions and efforts particularly if it could be designed to meet the child at his own level. This project method was founded upon three principles, the inductive-deductive process, apperception, and self-activity.[21] This thesis will be more concerned with the third and the effect of self-activity on the promotion of interest. McMurry felt that interest could be aroused if the projects were real and worthwhile.

When speaking of geography teaching, McMurry suggests that if the students show a lack of interest, it can be re-

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[20]Charles A. McMurry, Teaching by Projects, (New York: The MacMillan Company, 1920), p. 2.

[21]Ibid. pp. 85-92.

gained through the use of concrete, graphic, illustrative materials. He also suggests that there is an excellent opportunity to correlate social studies with art and mathematics.[22] McMurry suggests that:

> Board maps, sand models, reliefs, wall maps, pictures, geographical readers, and magazines, books of travel, and product collections should be at the constant service of the teachers.[23]

McMurry advocates the collection of materials for the enrichment of the studies. This type of activity is beneficial because it begins the habit of collecting and organizing materials; because it provides illustrations of the material to be learned; and because the collected materials can be the basis of an oral report. In support of these assertions McMurry states as follows:

> Maps, pictures, diagrams, models, materials, products, excursions, and manual constructions should be freely used to give clearness and reality to geographical studies.[24]

Many of McMurry's innovations, through the project method, are incorporated in our progressive techniques which are used today. This being true, there is no further need for enlarging upon the lasting effect of his work on our present educa-

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[22]Charles A. McMurry, Special Method in Geography, (New York: The MacMillan Company, 1903), pp. 107-121.

[23]Charles A. McMurry, Course of Study in the Eighth Grades, Vol. II, (New York: The MacMillan Company, 1906), p. 108.

[24]Charles A. McMurry, Handbook of Practice for Teachers, (New York: The MacMillan Company, 1914), p. 92.

tional programs.

Helen Parkhurst (1887-) had crystallized her philosophy upon which she organized her unusual type of school program. The plan was based on individual differences giving a maximum amount of freedom, group interaction, and concrete objectives for the students.[25] The purpose was to establish laboratories for each subject, to eliminate formal classroom procedures, and in general to convert the school from an institution to a community. As Helen Parkhurst summarizes this program she says:

> To sum up, the Dalton Plan should primarily be regarded as a way of school living. It is a way wherein each individual soul can find opportunity for use and expression of the best that in him lies. Only can personality reach its highest development and learning become pregnant with purpose.[26]

John Dewey (1859----) has a philosophy of education which is based on his psychology and which is supported by the best thoughts and techniques of those who preceeded him.[27] He puts the greatest emphasis on the continual growth of the child and his interaction with the environment.[28] Dewey points out that the child who learns through experience may be better educated than when he learns from the teacher or the text.

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[25]Helen H. Parkhurst, Education on the Dalton Plan, (New York: E. P. Dutton and Company, 1922), p. 19.

[26]Helen H. Parkhurst, "An Explanation of the Dalton Laboratory Plan," (Dalton Association, London, 1926), p. 8.

[27]Woody, The Activity Movement, op. cit. p. 39.

[28]John Dewey, Democracy in Education, (New York: The MacMillan Company, 1938), pp. 5-38.

By beginning with the child at his level, by basing the work on his interests, the student will develop properly in his educational program. The student will become an individual through his adjustment to the problems which confront him, and since the teacher is an integral part of the student's environment as well as the director of the student's activities, the teacher must assist the child to make those adjustments.

The part of Dewey's educational philosophy which pertains to this thesis emphasizes expression through a mode which the child knows. When speaking of art, Dewey says that the school must offer an "opportunity for contact with more media of expression in order that each learner may find the media for expressing himself with satisfaction.[29] Dewey also states that children have a desire for social communication, inquiry, construction and artistic expression. Most children enjoy doing something with the basic skills that they possess, and as they try to express themselves, they achieve some form of learning.[30] Also since activities can provide a real motive as well as provide a contact with reality, they should be a part of the educative program.[31]

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[29]Lois C. Mossman, The Activity Concept, (New York: The MacMillan Company, 1938), p. 151.

[30]John Dewey, School and Society, (Chicago: The University of Chicago Press, 1900), pp. 39-43.

[31] Ibid: p. 20.

Dewey sums up this part of his philosophy by saying that:

> The problem is then (1) to furnish the child with a sufficiently large amount of personal activity in occupations, expression, conversation, construction and experimentation, so that his individuality, moral and intellectual, shall not be swamped by a disproportionate amount of the experience of others to which books introduce him; and (2) so to conduct this more direct experience as to make the child feel the need of resort and command of the traditional social tools--furnish him with motives and make his recourse to them intelligent, an addition to his powers, instead of a servile dependency.[32]

Nicholas Murray Butler (1862-1947) helped to promote the Herbartian idea of developing the many sides of interest within the child.[33] When speaking of his program for secondary schools, Butler proposes that drawing and construction be included. He felt that this part of a program would develop expression, train judgement, call out executive powers and give self confidence in dealing with real materials. Butler suggests that "constructive work will naturally employ for its material pasteboard, clay, soft wood, and metal successively."[34]

Mary P. Follett (1868-). Although she was primarily interested in occupational adjustments, Mary Follett has affected the psychological thinking of her time, She believed

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[32] Ibid: p. 105

[33] Nicholas Murray Butler, The Meaning of Education, (New York: The MacMillan Company, 1898), p. 82.

[34] Ibid: p. 179.

that there is a freeing of both people when they are involved in the same experience.[35] This thesis will be concerned with her concept of evoking latent abilities within the individual. When speaking of the broad field of human relations, she makes certain statements which have educational implications, and although she is speaking of industrial relations, the strength of what she says should not be lost by the educator.

William H. Kilpatrick (1872-) carried forth the Dewey conception of continuity in education, but he emphasized the action of the student. Kilpatrick felt that activities are an essential phase of education because the child is continuously growing and capable of establishing his own goals, and because the student receives many useful associations.[36] When involved in these activities, the student should go through four steps which are purposing, planning, executing, and judging. If the child practices all four of these steps successfully, he will be educated.[37]

It is Kilpatrick's belief that one purpose of education is to find the areas for creative action; to improve on and to provide for these situations in which creation can be forthcoming; and to locate the means which are essential to better

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[35]Mary P. Follett, Creative Experiences, (New York: Longmans, Green and Company, 1924), p. 303.

[36]William H. Kilpatrick, Foundations of Method, (New York: The MacMillan Company, 1929), p. 129.

[37]Ibid. p. 212.

creation.[38]

Edward L. Thorndike (1874-) is noted for his scientific work in the field of individual differences.[39] Through his efforts the measurement movement of the early 1900's came into being. Kilpatrick and his associates investigated many of the areas of learning to determine the importance of certain factors in the education of the individual.[40]

Through the efforts and inspiration of Thorndike, much that was considered "progressive" is now incorporated in our educational systems. He has stimulated others to investigate further, and today we have a group of people who are specialists in various phases of educational psychology.

Henry C. Morrison and Harry L. Miller should be considered at this time because of the important part they played in the evolution of the unit method. Although each had a different viewpoint, they emphasized the need for motivation and enrichment. Morrison felt that the school should make provisions for constructive activities,[41] and Miller believed that enrichment

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[38]William H. Kilpatrick, A Reconstructed Theory of the Educational Process (A pamphlet; Bureau of Publications, Teachers College, Columbia University), p. 16.

[39]Edward L. Thorndike, Individuality, (Boston: Houghton Mifflin Company, 1911).

[40]See Edward L. Thorndike, Fundamentals of Learning, (New York: Teachers College, Columbia University, 1925).

[41]Henry C. Morrison, The Practice of Teaching in the Secondary School, (Chicago: The University of Chicago Press, 1931), p. 178.

would be gained through the integration of various phases of education.[42]

Junius L. Meriam, H. Caldwell Cook, and Ellsworth Collings. These three men are being considered together because they emphasized the significance of the child and his ability to learn. Meriam infers that handwork can be educative and that it is suited to the child's level. He proposes that handwork be included in the elementary curriculum because it is purposeful, because it has practical significance, and because of the intrinsic educational values.[43] Cook supports these contentions of Meriam through a different method which he calls the "Play Way".[44] Here experience is essential, and it is based on the interests and ability of the student to learn. Collings believes that the curriculum can be drawn from the students' lives, that there is continued growth when this is done, and that this type of program is feasible.[45]

These leaders of the Activity Movement have contributed substantially to the philosophical background of this thesis.

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[42]Harry L. Miller, Creative Learning and Teaching, (New York: Charles Scribner's Sons, 1927), p. 86.

[43]Junius L. Meriam, Child Life and Curriculum, (New York: World Book Company, 1927), pp. 367-381.

[44]H. Caldwell Cook, The Play Way, (New York: Frederick A. Stokes Company, 1919), pp. 28-47.

[45]Ellsworth Collings, An Experiment with a Project Curriculum. The MacMillan Company, 1925), pp. 339-342.

The unit of the third chapter of this thesis is organized according to the philosophy of Doctor Roy O. Billett. which is presented in his course, "The Unit Method in the Secondary School" at Boston University, Boston, Massachusetts.[45a]

The ideas, organization and terminology are based upon this philosophy. The unit organization constitutes a methodical technique for the presentation of those factors which are closely related under the topic so that the students and teacher can achieve their objectives.

The terminology consists of those terms advocated by Doctor Billett. The unit, the indirect learning products, the unit assignment, the optional related activities, and the tests conform to the tenets of the above professor. One exception is made; the delimitation is modified, in part, to form the outline of content which was suggested by William H. Cartwright of Boston University.

Moving from this philosophical background, the author has investigated recent practices and has combined them with his own experiences to formulate certain methods of motivating slow students.

[45a] Roy O. Billett, Fundamentals of Secondary School Teaching, (Boston: Houghton-Mifflin Company, 1940), pp. 459 - 657.

CHAPTER II

METHODS AND MATERIALS

This chapter contains a description of the methods and materials which can be used to motivate slow students in their study of social geography in the seventh grade. To make the methods valid and to make the materials more useful, they will be gathered from current literature and the experience of the writer. By so doing, speculative suggestions will be eliminated and actual classroom use will be the criterion for establishing the worth of the contents of this chapter.

For adequate coverage, each activity will be presented according to the following form. First will be a description of the method and its ramifications. Second will be the source and use of the materials essential to the fulfillment of the method. Third will be the value of this method as a motivating force. And last will be the intrinsic value to the student and the class. It must be admitted that certain parts of these methods and their results will be subjective, and that they are not universally applicable to all classroom situations. As stated in the introduction to this thesis, any suggestions made should be adapted to the needs and capacity of each group of students.

THE MUSEUM

Due to an absence of graphic materials other than those common to the classroom, there is a demand for supplementary materials. Often in class the oral description by the teacher or the written description in a text is inadequate to provide the student with a true concept of the subject being discussed. In the unit of the third chapter we have an outstanding example. When discussing the difference between anthracite and bituminous coal, it is extremely helpful to provide the student with a piece of each so he can distinguish one from the other.

This demand for concrete examples is real and incontestable particularly at the seventh grade level. When the students are supplied with these materials, they derive a greater understanding of the substance of their environment which may not be as vivid when described either orally or in written form. It is essential to broaden the experience of these students to form a basis for further learning. Through this visual and tactual experience the students are provided with additional associations.

Within each group of students there are individuals who have latent creative ability or untried administrative capabilities. To let these lie dormant is not in keeping with current educational thought. There is a need to provide for these abilities and the museum provides an opportunity. The problem of organizing the materials is present and by giving

the students the responsibility of the solution, creative and administrative abilities are utilized. The students have a medium (the museum) through which they can exercise their abilities.

Whenever possible, the organization of the museum should be a product of teacher-pupil planning. The following is a plan which was formed by the combined thinking of the author and his students.

The Board of Directors. Since three divisions of seventh grade students were involved, a board of directors was established with five representatives from each group. These members were elected by each division to represent them in all meetings. From the members of the three divisions (whether they were on the board or not) one person was elected as curator to act as the leader of all the museum activities. This board was given the responsibility of formulating all the general policies of the museum, and they met once a week for consultation.

The Committees. To supplement the work of the Board of Directors, five committees were formed. These committees were delegated certain powers and duties with the understanding that there would be an overlapping of responsibilities. The committees and responsibilities are listed below.

1. The Research Committee. This group of students had to locate materials and certify the accuracy of those specimens which are contributed to the museum.

Along with this the committee had to find new materials for the museum. Any unknown materials were to be investigated and labelled.

2. The Arrangement Committee. The members of this committee were responsible for the arrangement of all specimens, for the storing of excess materials and for finding adequate space for the display of specimens.

3. The Filing Committee. This group was to work in close connection with the research committee. The filing committee had the responsibility of cataloguing and preserving all information which was received. It also had the job of recording the names of the contributors and their contributions.

4. The Illustration Committee. This group was responsible for producing all materials which were necessary to illustrate the specimens or to complete any art projects which were necessary.

5. The Selection Committee. This group was responsible for selecting the most suitable materials and determining which specimens should be included in the permanent collection of the museum.

In order to guarantee that the largest number of students would participate in the museum each member of the class stated a preference for the type of committee to which he would belong.

But since the division of over ninety students into five committees would have made an unwieldy group, the committees were divided up into active and inactive sections.

The active group consisted of a small number of the committee members who were participating members for a period of approximately two weeks. At the end of that time, a new group of students were drawn from the inactive section to assume the responsibilities of the committee. This was not a rigid rule since certain exigencies of the situation may require otherwise.

When the class has been organized and adequate space is provided, there comes the question of suggesting the types and forms of exhibits. The author found that one of the best sources of suggestions is the local museum. If the school is fortunate enough to be in the proximity of a public museum which specializes in portable exhibits the problem is solved. At the Children's Museum, Jamaica Plain, Massachusetts, just such a service is provided.[46] By using these exhibits the students received suggestions which were copied or were an inspiration to do something original.

As to the method of displaying the material of the students, there are many possibilities, but it is essential to remember that articles of the museum should be readily accessible to the

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[46]Bernice Elliott, "The Mountain Comes to Mohamet," The Nations Schools, 34:51-52+, December, 1944.

students.[47] They should be able to handle them for close inspection. In this way the museum is more functional than when the exhibits are locked behind glass. It is suggested that articles be displayed on a tray with a label space attached.[48] By so doing the material can be handled easily, the label will not be lost, and the specimen can be left on a table.

The materials necessary for the museum can be placed in two categories: one, the equipment for display and two, the materials which are to be displayed. Of the first group, any furniture can be used (tables, window sills, book cases, etc.). Many times the students can provide their own tables or cabinets. An example of this is offered by Ercel Kozee, whose students constructed a table out of logs.[49] According to Kozee's report the students were very enthusiastic in their construction project.

With regard to the second category of materials, there are certain principles which should guide the selection of materials. Use only those specimens which will promote a better understanding of the subject being studied. Also the teacher

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[47] Ibid. p. 51.

[48] Edwin Jacobs, "Displaying Museum Specimens," School Science and Mathematics, 39:656-657, October, 1939.

[49] Ercel Kozee, "Values of a Nature Museum," The Instructor, 55:24+, April, 1946.

should avoid the use of curios.[50] When it comes to the source of these objects for the museum, the community is undoubtedly the best source. Working with and through the students many different materials can be obtained. This was done at the Laboratory School of the State Teacher's College, Indiana, Pennsylvania, with gratifying results.[51]

The uses of the museum are limited only by the types of exhibits and the energy expended in producing the museum. The various articles can be used by the teacher for demonstration purposes. The writer has found the museum particularly useful for just this purpose. When time is available before classes, the students have an opportunity to utilize this time advantageously by looking over the articles on display. The author also found that the students were able to get first hand information, and when they handled the exhibits, the benefits were multiplied.

The museum provides an opportunity to beautify the room. It helps to establish an essential atmosphere which is both pleasant and conducive to serious work.

Undoubtedly the greatest benefit derived from the museum comes from its use as a motivating device. The slow students

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[50]R. Colbert, "One Year with a History Museum in a Small High School," The Historical Outlook, 16:167, April, 1925.

[51]Wilbur Emmert, "Classroom Museum Promotes School-Community Relations," The Educational Screen, 19:388, November, 1940.

have an outlet for any models, paintings, or other objects which they may be capable of making. An example of this is given by Davis and Cutler.[52] In this case ninth and tenth grade students with I.Q.'s ranging from 70 to 95 were concerned. They lacked reading and writing ability, but they had skills in other areas. These students were placed in special classes and their work was based on individual interests. One particular student had an interest in and talent for making maps. By capitalizing on these attributes, the teachers found opportunities for guidance. If good results can be obtained in such a case, it is conceivable that the opportunity to display these materials in a museum will increase the slow student's interest. In conjunction with the administration of the museum, the slow student need not be left out. The care of the exhibits and the maintenance of the display cases can be entrusted to the slow students.

A high level of interest can be maintained by the use of the museum. Edna M. Van Houten reports that after running a museum for ten years, she found that it "awakens interest, controls interest, and promotes interest."[53] This can be attributed to the fact that the museum belongs to everyone in

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[52]Anna L. Davis and Kenneth R. Cutler, "Methods for Use With the Non-Academic," California Journal of Secondary Education, 14:203-205, April, 1939.

[53]Edna M. Van Houten, "A Museum in a Schoolroom," American Childhood, 26:15-16, September, 1940.

the class, Besides, all students have equal opportunity regardless of abilities, to contribute to the fund of materials and knowledge of the class.

At the seventh grade level, there is an ever-present demand for recognition by all students. This is especially true for the slow students. The writer has had numerous individuals who have gained success through the museum, and the level of their work has been subsequently raised.

The museum is valuable both to the students and the class. Difficult concepts can be demonstrated in class and as a result, the students are provided with a greater understanding of their environment. In the unit of Chapter Three, the samples of coal presented to the students in the museum were concrete examples of one of the fundamental fuels. The students demonstrated to the writer that with these exhibits they were better able to connect the properties of various types of coal with their uses.

When the museum becomes sufficiently large, it becomes a source of various displays which can be used to make the school a more interesting place in which to work. The museum provides a common enterprize for the class, and the centralization of effort is beneficial in the development of a spirit of cooperation amongst the students.

THE CONSTRUCTION OF MODELS AND OTHER THREE-DIMENSIONAL PROJECTS

Seventh grade students have demonstrated a desire to make models, three dimensional maps, dioramas, and various other miniature reproductions. Often these hobbies can be utilized in the study of social geography. The writer has had two outstanding examples which may serve to elucidate this method of capitalizing on students' hobbies. During 1946, while studying Central America, Joseph Kraemer was inattentive and lackadaisical about his work. It was ascertained that Joseph greatly enjoyed working with his hands. Using this as a starting point, it was suggested that he make a model of the locks of the Panama Canal. Within a week, Joseph had gathered enough information from pictures and some reading so that he was able to proceed on his model. At the end of another week, the model was finished, and because his talents were recognized, he was induced to assume more responsibilities and to contribute more to the class.

In 1947, another student, Robert Huskins, showed no interest in social studies. Many techniques were used to motivate him, but none were successful. Finally, a model was suggested. The class was working on the unit of Chapter Three, so Robert was prevailed upon to make a model of an oil derrick. He was presented with numerous pictures, and from them he constructed from toothpicks a replica of an oil derrick. This model was used by the writer for class demonstration, and

from the success the boy received, he was motivated to do more work in social studies. These two cases clearly indicate that there is a need to provide for the manual dexterity of the students.

The construction of models or the creation of three dimensional projects provide an opportunity to cross the departmental lines between art and social studies. This type of correlation is not too prevalent, but it can be useful. By recognizing the work done in the art class, the student finds a use for the product of his efforts, and that product can be useful in enriching the social studies.

To make this type of activity useful, time and space should be made available to the student. First, when time is allotted, the student will feel that his work is valuable. By virtue of the fact that a specific amount of class time is reserved for his use, he will be prompted to do a good job. Also the teacher will have the opportunity to supervise and direct the student in his work. The ideal situation occurs when an art activity period, such as exists at the Bigelow Junior High School, Newton, Massachusetts, is provided for just this type of activity. With the close cooperation of the art and social studies teachers, much valuable material can be created by capitalizing on the child's interests.

Secondly, the space should be provided so that the students will, as in the case of the allotted time, feel that their work is of importance to the class. When an art activity period is

not available, a reasonably sized table in the classroom can be used as a work bench. This offers the student an opportunity to complete his project under suitable conditions without cluttering up the rest of the room and causing confusion. This helps to make the task more definite.

One of the best sources of information is a collection of pictures. Many students find it difficult to plan their projects or they may be unable to perceive the completed model. Therefore, when they possess pictures which give them hints and which are superior to printed or oral description, the students are better able to visualize the completed project. This is particularly true in the construction of dioramas. When trying to picture the scene, the students must have suggestions which are intelligible. From these illustrative pictures the students can proceed on their own initiative to complete their work. They will be moving in an element with which they are familiar.

Often the child will be hampered by a lack of means of representing objects in miniature. At this point the ingenuity of the teacher will be called into play. Although G. A. Jester wrote about an architectural class in which model making was emphasized, the suggestions he made can be adapted to the seventh grade level.[54] The following are methods whereby common

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[54]G. A. Jester, "Architectural Models," Industrial Arts and Vocational Education, 29:340-342, October, 1940.

objects can be represented. Windows can be made of cellophane or celluloid. Grass can be made from a mixture of green paint and sand. Evergreens can be made from steel wool which has been covered with glue and dusted with flour. Hedges can be made by putting steel wool over wire. With such suggestions as these from the teacher, the student will be able to solve his problems and to devote more time to the essential factors in his construction activities.

When the teacher finds a subject which is of special interest to an individual or the class, he should promote that interest as much as possible. A. J. Sommerfeld, principal of the Concordia Lutheran School, Kirkwood, Missouri, found that his sixth graders were interested in Abraham Lincoln.[55] At the suggestion of their teacher the students constructed a model of Lincoln's home. Twigs were used for logs, branches were used as trees, miniature furniture was made. Girls were interested in decorating the interior while the boys provided the outside fixtures. As Sommerfeld expressed it, the students derived much pleasure from planning and building this model.

This type of activity does not require a great variety of materials, nor must this material be of a high quality. Paste, paper, clay, paint, wood, and other stock is provided in most schools. This source is adequate for all the necessary con-

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[55] A. J. Sommerfeld, "Log Cabin Project," School Arts, 41:53, October, 1941.

struction activities, but many times there are outside organizations which will offer material and information to the students. Some members of a high school architectural club were interested in Egyptian architecture.[56] The Museum of the University of Pennsylvania supplied the club with cardboard, wooden beams and columns, historical data, construction and coloring instructions. Using this material and information, the students organized a plan for the house; they built the model which was used in both the art and history classes to enrich their studies. Although this was carried on at the high school level, such cooperative programs could easily be adapted to the seventh grade level.

The third source of material, other than the school or other community organizations, is the home. Most students have the necessary materials, such as cardboard and paste, from which they can construct models. At a low cost, balsa wood may be purchased. Many of the students have the hobby of building plane models, and the construction of any of the commercial products which can be of use to the class and the individual should be encouraged. Whenever possible, the exhibits which can be borrowed from museums should be used for suggestions. Many times the exhibits can be duplicated from materials of the home. Girls may find scraps of cloth which can be cut,

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[56]Jacob J. Weitzenfeld and Harold E. Schofield, "Egyptian House Model," Industrial Arts and Vocational Education, 30:435-6, December, 1941.

sewed, and out on dolls to represent the costumes of other people.

These models can be extremely useful to the class, but there are certain precautions which should be taken. First, are the project and results expected worthy of the effort that will be consumed? Second, is the factual content accurate? Third, is the model large enough to give the essential details? Fourth, is it portable? Fifth, is its construction simple enough for students to do? Sixth, will the cost be low enough?[57] If these questions can be answered in the affirmative, the project will be worthwhile. "Each activity should contribute directly to the understanding of some aspect or process of social life; that is, it should be strictly subordinated to the important concepts that make up the curriculum in social studies."[58]

This type of constructive activity is very useful as a motivating device for the slow students. They are provided with concrete results for their efforts, and other fields of interest are opened. The building, modeling, making activity may suggest some worthwhile hobbies to the students. At the

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[57]Julia Van Fleet, "The Diorama Comes to the Classroom," Educational Screen, 22:204-205, June, 1943.

[58]Ernest Horn, Methods of Instruction in the Social Studies, Part XV, (Report on the Commission on the Social Studies, American Historical Association, New York: Scribners, 1937), p. 417.

Bryant Elementary School, Harvey, Illinois, the students of the eighth grade were interested in South America. While studying the life and customs of the people, the girls became interested in making dolls to illustrate what they had learned.[59] Wire, paper towels, crepe paper, paste and other materials were used. When the dolls were finished, they were displayed in a gay patio setting. "The display was very effective and colorful. The children experienced real pleasure and satisfaction in the projects. Many of them plan to make more dolls to be used as gifts."[60]

There is a provision made for utilizing the students' desire for recognition, with a resultant increase in interest, when these models are used for classroom demonstration. The teacher has something concrete upon which he can bestow his praise. The students find a worthy outlet for their energies, and they can direct their work in art toward a real goal. The slow student is able to contribute materials for use in the classroom and is able to compete with the fast student.

There are certain values which accrue to the individual and the class. In the case of the former, the student may develop a hobby which can be a desirable use of leisure time. The student may even develop this creative ability from a

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[59]Margaret Swords, "Eighth Grades Make Latin American Dolls," School Art, 43:238, March, 1944.

[60]Ibid. p. 238.

hobby into a vocational activity. During the W.P.A. program many people became interested in the extension projects of a W.P.A. museum. From the training received, the people built models, relief maps, charts and other visual-aids materials for use in a program of education for defense.[61] Some visual aids were built for school room use. It is not too fantastic to imagine that interest could be developed in this type of vocational activity. At least the student will be exposed to and initiated into this broad area of vocational endeavor.

When using three dimensional objects, such as a diorama, there is much to be gained in the classroom. This phase of an educational program was considered to be of such importance that the Museum of Natural History in New York City, held classes in the building of dioramas.[62] The children were instructed on the best techniques to use. The author of this article said that the diorama produced could be used as a center of and as a means of motivating discussion. This may be accomplished through the challenge which the diorama would present to the observers.[63]

The greatest value for the class would stem from the

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[61]Florence Kerr, "The Craftsman Contributes to National Defense," Educational Screen, 21:58-59, February, 1942.

[62]Irene Cypher, "Three Dimensional Learning," Nations Schools, 34:52+, September, 1944.

[63]Ibid. p. 52

increase in participation of the non-learner in the regular classroom activities. If the slow student can be motivated through his interests and abilities to construct models, the class will be greatly benefited. The model itself can enrich the studies, and more of the teacher's attention can be diverted to the disinterested student. The author believes that any device or method which can be safely used for this purpose deserves much consideration.

ART - PHOTOGRAPHY

This term, art-photography, is used to cover a wide variety of activities, which may range from drawing to collecting pictures from magazines. This section will be more concerned with those activities which call upon the creative ingenuity of the students, but the practice of collecting pictures cannot be discarded. There is a felt need for the continued emphasis on the artistic expression of students. At the elementary level, self-expression through art is exploited to a high degree, and since the seventh graders are going through a process of reorientation in the junior high school, this mode of expression should be continued. The students will feel more secure, and the reorientation will be less difficult.

Educators generally agree that there is a need for a large number of associations to guarantee some retention of basic understandings. When studying the social studies this

is particularly true.[64] The students may develop these associations through the creative art work which is correlated with social studies. There is a definite need for the graphic expression of many concepts which are necessary to understand the world. If these representations can be made by the student, the concepts will be greatly enhanced.

A large percentage of the students in the seventh grade are interested in drawing, and since art may be a required subject (it is in the author's school), it seems advisable to capitalize on this situation. Students may be developing photography as a hobby, and this may also fit into the proposed program. The students need some recognition for their work; the most logical place to receive this is in the classroom.

Students also demonstrate a tendency to collect various materials when they are in the seventh grade. This tendency should be provided for in the social studies by giving credit for collections of pictures which pertain to the subject being studied. This need for recognition is outstanding because the students demand some outlet for their varied interests.

To provide for these needs, the teacher should need little beyond the ordinary classroom accoutrements. All he has to do

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[64] William Badger, "The Grade Placement of Social Studies Materials," Social Studies, 31:210-219, May, 1940.

is to provide adequate time in class so that the students may proceed under proper direction. In this way time is conserved for the student. To do a good job, the teacher should provide numerous pictures, maps, charts and information so that the students will have a basis for their own creative endeavors. Magazines, newspapers, and textbooks should be within easy reach of the students. Ephemeral booklets, pictures, and photographs can be a source of inspiration for the neophyte artist as he attempts to portray his concepts of a living, working world.

The bulletin board in the classroom may be reserved for displaying the products of the students. When the author found that the bulletin board space available was inadequate for displaying all the material received, a substitute was devised. Eyelets were put into the woodwork above the blackboard and wire was stretched between them. More space was available than had been previously, because the students' drawings and pictures were hung from the wire.

There are certain dangers which must be avoided when using these art objects of the students. First, the pictures may not have a value beyond their own beauty, with the result that they do not offer any associations with the topic under discussion. Secondly, the pictures may not provoke any critical thinking by the students. When the student embarks upon an art activity, the teacher should assure himself and

the student that the product will be useful. Thirdly, the teacher should guard against stressing the manual rather than the intellectual factors involved.[65]

The materials for this type of activity can easily be supplied by the school. Pencils, paint, crayons, and paper are all that are necessary. These may be supplemented by the home, and other supplies may be obtained from organizations in the community.

To demonstrate the above suggestions the author would like to cite the case of Patricia Perrine, a slow student who did not contribute to the class discussions. She was prevailed upon to make a series of maps illustrating the locations of natural resources of the United States. When this art project was completed, it was deliberately displayed so that the attention of the class would be drawn toward the girl's work. The cost of the materials supplied by her parents was a small price for the benefits their daughter received.

L. March suggests several other sources of material or information.[66]

1. Drawings by the students. Cartoons and other pictures can be suggested by the teacher, and either he or

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[65]Horn, Methods of Instruction, p. 434.

[66]Leland March, "Pictures in the Social Studies," Social Education, 5:26-30, January, 1941.

the art teacher can supervise the work of the student.

2. Flat pictures, the National Geographic, Sunday newspapers, calendars, and magazines may be a source of pictures.
3. Many companies publish series of pictures for classroom use. (Copley Prints, Brown and Perry Prints, the Lehman Historical Series for Ancient and Modern History).
4. Photographs taken by the students can be helpful.
5. Lantern slides and movies can be a good source.

Once the art-photography objects have been made, their use raises a vital question. Fundamentally, the teacher must remember that "the purpose of using pictures in the teaching of history is to enrich the experiences of the students in order that they may augment their stores of learning and be more able to reach correct judgements."[67] Therefore, the teacher should be certain of the authenticity of the picture before it is used in class. When this is done, the teacher can feel free to refer to it often.

When using commercial pictures, the teacher should help the student to perceive and judge the pictures for himself. The student should be able to comprehend distance, depth,

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[67]Francis Ahl, "Pictures - Their Purpose and Use in the Teaching of History," Historical Outlook, 23:167, April, 1932.

weight, motion, speed, color, sound, odor, and temperature. Then the teacher can offer the students a variety of phases of the topic which is being discussed.[68]

Pupil-made lantern slides require more expensive equipment, and they may not be useable in a school of modest means. Therefore this activity will be sketchily discussed. The slides should be made by the students themselves and the drawings should be their own work. The equipment can be obtained at the Visual Education Service, 13 Clarendon Street, Boston, Massachusetts, or the Keystone Manufacturing Company, 288 "A" Street, Boston, Massachusetts.[69]

These art-photography activities are of tremendous value for motivating slow students, because the work itself will appeal to seventh graders, because there are adequate provisions for interest, and because they provide for recognition.

By appealing to the slow students, art-photography work can be a source of sustained attention. Many times the students are unable to comprehend abstract concepts, or the illustrations in the text may be inadequate. With colorful charts the students have a simplification of the concept which

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[68]Mineta Merton, "Effective Use of Still Pictures in Elementary Social Studies," Social Education, 4:489-492, November, 1940.

[69]For further discussion of this project see Leland S. March, "Pupil-Made Lantern Slides in the Social Studies," 3:609-611, December, 1939.

makes it more intelligible to them. The author found that the concept of the prevailing westerlies affecting the climate of the west coast of the United States was understood only after a series of student-made charts were used to supplement the explanation. Since the students are familiar with their medium of expression, they are unhampered in their quest for knowledge; also, the students are guaranteed some degree of success when the work has a definite use which may gain some degree of social approval for them.

Interest is closely correlated with this social approval. There is an immediacy of results which cannot be gained through continuous reading. These slow students require many associations to insure the understanding of the topic being presented in class. Many times the interest stems from intimate problems which arise in the lives of some of the children. At the Columbus School of Westfield, New Jersey, some of the students had friends in the service who were close to or in Australia.[70] On the basis of this interest, the class constructed a map, three and a half by four feet, on which they pasted the essential facts of their unit. This art activity was a focal point for the energy of the class, and the work was less tedious. The teacher stated that "all throughout this unit, I felt that

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[70]Emily M. Fryberger and Rachel M. Sullivan, "A Unit on Australia," School Art, 46:244, March, 1947.

the art work was an important stimulating factor."[71]

Recognition is provided in art-photography activities because attention is focused on the student's abilities--not his disabilities. Often students may find companionship through a cooperative activity, and each contribution, small as it may be, will produce desirable results. The fact that a student can embark on a joint enterprize can be a sign of recognition in itself. This point is strengthened by the results of a unit in the eighth grade at the Central Platoon School, Brush, Colorado.[72] These students were studying the history of their area; as a class project they decided to paint eight large pictures depicting the important events. Drawings were submitted by all the interested students, and those selected were put on the final tableau.

Art-photography activities have an intrinsic value for the students and may stimulate slow students to extend their reading. The development and recognition of latent skills can foster an increase of interest in other fields. The girls of the Sippican School in Marion, Massachusetts, became interested in the nicknames of States.[73] The students scaled, cut and

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[71] Ibid. p. 244

[72] Vesper Bass and Benjamin Curry, "History of Platte Valley," School Art, 41:319, May, 1942.

[73] Evelyn M. Barrows, "A Nickname Map," School Art, 46:251, March, 1947.

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colored a map of the United States, and on each one, the nickname was attached. Each student assumed the responsibility for determining the origin of each nickname. The investigation projected the students into research activities and, "The project proved to be very interesting to all who viewed it and was certainly a most instructive unit of work for the girls responsible for it."[74]

The products of an art-photography program can be of great value to the class; the charts, maps, etc. can be filed in the classroom and made available for future use. The student-made material can be useful in classroom illustration as well as making the room a more pleasant place in which to live.

CORRESPONDENCE

Too often the teacher, the school librarian, or some other member of the faculty, must supply the supplementary materials for classroom use. The author believes that such a practice results in the loss of an excellent teaching situation. Students should be encouraged to write for graphic material which is made available to the schools by governmental and private agencies.

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[74] Ibid. p. 251.

There is a definite need for ephemeral material which will enrich the study of any unit in seventh grade social studies. Most of this printed matter, which is received, is colorful. The students demand some other source of information than textbooks or reference books, and this need must be met to provide adequately for the students.

The concepts which are taught in the social studies may remain in the classroom because the student is unable to make a practical application of the knowledge he has gained. When this occurs, the student is not being fully prepared to take his place in a dynamic society. Nor has he had complete learning. This incompleteness can be overcome through correspondence activities wherein the child receives information on the practical applications as they occur in the government or industry. This information enhances the value of the learning the student has acquired, and it may be the factor which can modify his attitude toward school and society.

Every student must become acquainted with the intricacies of his own community organization and the multitudinous phases of our economic life. He must be made to realize that there are other agencies than the school which are interested in his education and enlightenment. He must be conscious of the correlation between his school life and the growth of this nation. This can be accomplished to a certain extent by the use of correspondence in the classroom.

The correspondence activity provides one essential factor which transcends all others. For a minimum amount of effort, the student will receive ample reward for what he has done. Out-of-school agencies are only too glad to send information to those who are anxious for it. Of course, once the material has arrived, the teacher and students must use it. This will require a shelf or table on which the material can be displayed. The author found that an oversized window shelf marked "Unit Material" was adequate for display purposes. The books, pictures, charts, maps, folders, etc. were displayed in any suitable place in the room. It seemed advisable to make the material readily accessible to the students for their use.

Correspondence work is excellent for correlating English and social studies. When teaching the elementary forms of business letters to seventh grade students retention will be high if these forms are used for a purposeful activity. Many factors such as clarity of expression, sentence structure, spelling, good penmanship and others can be taught through letter writing. Once again there is a practical application of the skills acquired in the classroom; they can be more meaningful.

The necessary equipment for this activity can easily be supplied by the school. Penny postal cards or stationary can be bought for a nominal fee, and the results will more than

pay for the investment. The students will need some suggested addresses. These can be found in magazine advertisements or in professional literature. The list of addresses on page 93 were acquired in this manner. Inexpensive booklets can be obtained from the Superintendent of Documents in the Government Printing Office, Washington, D. C. By writing to this department a price list can be procured. The governmental material is classified into such categories as:

1. Immigration.
2. Industrial conditions.
3. Population trends.
4. Natural resources and conservation.
5. Family income.[75]

These booklets are excellent because of their completeness and unbiased treatment of the topics.

The author has found that the materials received had many uses for the students and the teacher. The foremost use of showing the practical application of concepts has been discussed above, but the author offers this example from his experience to substantiate his tenets. While studying the unit in Chapter Three, the students had difficulty understanding the process of extracting and using the by-products of soft coal. When one of the students received a large variety

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[75]John A. Perkins, "Uncle Sam's Bookshop," Social Education, 4:177-179, March, 1940.

of charts and colorful booklets from various coal companies, and when this information was given to the class, the slow students were better able to understand; some were motivated to investigate further.

The collection of information from outside agencies can be used by the group or the individual. It can be used in classroom demonstration or for individual reference work.

There is one other valuable use of the material collected. After it has supplied the needs of the students for the current unit, the material can be given to the school library, or it can be added to the classroom library. By so doing, a wealth of interesting and colorful material can be accumulated over a period of years. Each class can contribute its share to the fund of information.

Letter writing appeals to the slow learner; the work involves a variety of activities since long letters are not necessary. When the student has a large number of addresses, he can use them over a reasonable length of time with the result that attention will be sustained. The student can get some results for his work, and he will be making his contribution to the class work. Frederica Upchurch suggests that one letter selected from the class be used.[76] The

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[76]Frederica Upchurch, "Letter writing and the Unit," American Childhood, 28:17, November, 1942.

author disagrees with this method in that the slow student may not be able to compete successfully with the fast student. Miss Upchurch did get results because "when answers begin to arrive it certainly adds something to the interest of the work."[77]

The author found that a mild form of rivalry between the students was beneficial. Daily students presented the material received, and the success accompanying the recognition helped to motivate the slow students. Correspondence can appeal to those slow students who may have no drawing or building ability; it may provide for those students who are deficient in reading and other skills in education. Since there is a need for only a minimum amount of equipment, and since the students are working in an element which is not entirely new to them, corresponding can be very attractive.

At the Wichita High School East, Wichita, Kansas, letter writing was successful in motivating a slow student.[78] The class was discussing the problem of writing a new handbook. Hans, the slow student, suggested that letters be written to ten or twenty towns to get information. Committees were formed, letter writing techniques were reviewed, and this class

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[77] Ibid. p. 17.

[78] Ida E. Boyd, "An Experiment in Writing Letters," English Journal, 29:52-55, January, 1940.

project developed into a survey of the handbooks used in all cities with a population of 100,000. Hans became enthusiastic enough to assume the directorship of the class program. As Miss Boyd says:

> It was a very alert and business-like Hans who took the completed report into the office for inspection. He had learned something about assuming responsibility and getting along with other people, as well as the joy of a job well done. And the entire class was now sure that there are many new things in letter writing.[79]

A high degree of interest can be maintained by using correspondence activities in the seventh grade social studies. A variety of correlated activities may accompany this extra work. One example is locating the place from which the letter comes. The letter heads may be cut off and pasted on a map.[80] Also, there is a great variety of topics relative to social studies which may be introduced through letter writing.

Students' interest can be developed on the basis of their acquaintance with the community enterprizes. In the author's classes it was found that many of the students did not realize that the local gasoline stations are one segment of an intricate organization, the petroleum business. Proceeding from the known agents in the community, we investigated the rest of the industry through correspondence.

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[79] Ibid. p. 55.

[80] Upchurch, "Letter Writing and the Unit," p. 17.

Correlation with English has been mentioned, and through writing for a purpose, the students' interest in functional English can be promoted to a high level.

Slow students can be motivated to do more in social studies because of the recognition they receive. Not only will the slow student be recognized by his associates for his contributions, but also he will receive recognition from people outside the school. Commercial and governmental agencies are anxious to send information, and often there is an accompanying letter addressed to the student. When these letters are read in class, the results are excellent. This is one efficient method of providing for individual differences.

Letter writing has an intrinsic value to the students and the class. The students have an opportunity to practice what they have learned in English for the benefit of the class as well as themselves. The material received can be used to acquaint the students with the broader aspects of various occupational fields. This, in turn, will broaden the students' experiences by carrying them beyond the classroom environment. As for the class, an additional source of information is offered. The whole will be better able to see the future implications of what they have learned in social studies. The class will be better acquainted with those commercial and governmental agencies whose goods and services they will one day be consuming and enjoying.

VISITING (INDIVIDUAL OR SMALL GROUPS)

This visiting activity is a modification of those excursions, trips or visits which involve class groups. This adaptation is necessary to provide for the slow students rather than the whole class.

There are certain outstanding needs which have fostered this suggested type of activity. In keeping with the modern trend in education, the community resources should be exploited to the fullest. By so doing, the students' contacts are widened to an appreciable degree. There is also a need to suggest worthwhile after-school activities; if the students have advanced training in visiting, they can employ the post-school time learning about the community. Students should develop the ability to observe and report their observations to their classmates. This can be accomplished through this visiting activity with a minimum amount of pressure from the teacher and with a maximum amount of interest for the students.

One of the fundamental tasks of the school is to instill in the students a sense of responsibility. This may be accomplished through small group visiting. If the students are thoroughly prepared, if they make the necessary arrangements, and if they complete the task, without the supervision of the teacher, they will have made a great advance toward assuming responsibility. This can be done in the seventh grade because the students have matured sufficiently to accept and complete

the task presented to them.

To provide for these needs there are certain conditions which must be made by the teacher. School time should be allotted for this activity. The students should sometimes be permitted to make their arrangements and do their visiting during school time. This is true because activities for which no school time is allotted are likely to be considered by students and faculty as "extra" work and of less importance than "regular" work. It is essential that the teacher prepare the students by a pre-visiting indoctrination on observation techniques. These techniques should be supported by a thorough knowledge of the establishment to be visited. The school can easily provide the necessary paper and pencils which the student can use for recording his observations. At the conclusion of the visit, the student should organize his findings and present them to the class, sometimes orally, sometimes in writing.

The necessary materials for the execution of this planned activity should consist of a set of pre-visiting objectives, a list of establishments which are willing to be visited, and the completion of arrangements. The author has used these procedures with good results.

Gaither suggests some planning points which can be helpful for the students as they go visiting.[81] He suggests that

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[81] F. F. Gaither, "The Excursion Project," Educational Screen, 8:104, April, 1929.

the students and teacher determine what is the basic purpose of the trip. Then when the arrangements have been completed, the students should make a list of questions, and methods whereby they can be answered through observation. As Gaither suggests, the success of the trip can be judged by the amount of the plan which is completed.[82] The teacher should also remember that there are certain preparations such as parental permission slips which should not be overlooked. Atyeo provides a complete list of precautions which should be taken.[83]

Building the list of establishments can well be a co-operative project carried out principally by the pupils, with the teacher serving as consultant to see that the list is adequate and that the visits will be constructive experiences.

This visiting activity has a great value as a motivating technique for slow students. Junge cites a case which occurred at the Grosse Point High School, Grosse Point, Michigan.[84] On a tour, Charles, who was a slow, self-conscious student, was lifted from his lethargy when induced to lead some of his fellow students. This boy was motivated to participate more

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[82] Ibid. p. 104.

[83] Henry C. Atyeo, The Excursion in Social Education, (Eighteenth Yearbook of the National Council for the Social Studies, 1945) p. 35.

[84] Paul H. Junge, "Guidance Through Tours" Nations Schools, 25:23-24, February, 1940.

actively in the class program. As a matter of fact, Junge goes so far as to say that:

> Since such tours enable a teacher to discover traits and interests of his pupils that are not brought out in the typical class, they should be included in the regular offerings of the school. These tours should not be considered extra-curricular but should be a vital part of every school curriculum.[85]

The variety of activities involved in visiting also helps to motivate the slow students. In a unit on community industries of an eighth grade geography class, Winchell found that visiting "left permanent, vivid impressions" and "gave interest and variety to the work."[86] The present author found that when this technique was used, the students were able to complete the activity without boredom setting in.

The slow students also have an opportunity to see the practical application of a concept which has been discussed in class. Students are supplied with facts which may not be obtained in reading, and the visit will broaden their experiences. In conjunction with this application of principles, the students are encouraged to build contacts in the community. Clarke found this to be true.[87] In a community survey in

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[85] Ibid. p. 51.

[86] Lawrence R. Winchell, "Field Trips Develop Community Interest," Education, 61:377-378, February, 1941.

[87] Katherine L. Clarke, "Making Community Resources in Education," Social Education, 4:112, February, 1940.

Springfield, Missouri, the students became acquainted with the various agencies which provide the goods and services to the community. Her results were excellent and the students derived much value from their experiences.

Interest is essential to motivation, and this can be accomplished through the visiting activity. The activity itself is interesting and varied. The goal set by the student is attainable, and he can receive immediate results for his efforts. The student, through thorough preparation, can be assured some measure of success in his undertaking, and a wide variety of lasting associations will be obtained.

Visiting by individuals and small groups has the advantage over class excursions when motivation is desired. The student will receive recognition by virtue of the special consideration given to him. Johnson cites an outstanding example of a boy who had a unique way of furthering his experiences in visiting.[88] This elementary school boy made himself a tour conductor, and every Saturday he took between eight and ten students on tours through the museums and other interesting places of the community. The student pre-pared the trip carefully by means of catalogues, guide books, and conversations with curators. This is a valuable experience,

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[88]William H. Johnson, "The Use of Community Resources," Social Studies, 31:149, April, 1940.

and a child would receive much recognition for his ingenuity and efforts. As Hartley suggests, the slow students probably know a great deal about the community, and they are offered the opportunity to capitalize on that knowledge.[89]

Visiting has an intrinsic value for students because of the multitude of opportunities offered. First, leadership can be developed, and secondly, the students can have real experience.[90] Curtis advocates that the trip be used "as a major instrument of instruction when the subject matter is readily accessible in the community. Especially when concrete experiences of students have been limited."[91] It is the whole experience of organizing, completing, on a singular activity, which can provide prestige for the slow student.

The class as a whole can also receive some benefits from this visiting activity. As the individual students observe and report on their experiences, the fund of knowledge is enlarged.[92] The class is supplied with information which was obtained firsthand, and the class may be exposed to some vocational sampling which will be helpful for the members of the

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[89]William H. Hartley, The Use of Audio Visual Aids in Individualizing Instruction, (Fifteenth Yearbook of the National Council for the Social Studies, 1944) p. 104.

[90]Ibid. p. 103.

[91]Dwight K. Curtis, "The Contribution of the Excursion to Understanding," Journal of Educational Research, 38:210, November, 1944.

[92]Hartley, Use of Audio Visual Aids, op. cit. p. 103.

class.[93]

INTERVIEWING

The interviewing activity is very closely allied to visiting, but there are certain needs which can only be met by interviewing. There is a definite need for students to make personal contacts within the community, and the teacher should not ignore this valuable source of information. The author found that when teaching the unit in Chapter Three, one of the class members, who had not been contributing, had lived close to the Mesabi Range in Minnesota. Although she was too young to remember, her parents were able to offer much valuable information. When the student realized that she had a personal contact with a topic being discussed, she was inspired to participate more in the class than previously.

Whenever possible, the students should be permitted to conduct their interviewing on school time since this will strengthen the motivating force. The teacher should instruct the students on the methods of interviewing, and when the activity has been completed, time should be given to the student for making a report. The school has only to provide the necessary materials (paper and pencil) for recording the results of the interview.

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[93]Winchell, "Field Trips," op. cit. p. 378.

To do an effective job of interviewing, the students should be thoroughly prepared in the techniques they will employ. At the John A. Lehman High School, Canton, Ohio, the students prepared a list of questions which were validated before use.[94] Each student who was about to embark on an interview used the questions on the teacher and the class. These students also collected information about the person to be interviewed, and to be sure that they were prepared, the students often practiced interviewing the teacher.

As James E. Bender of the National Institute for Human Relations in New York City, suggests, the student should build rapport which is "essentially a state of reciprocal confidence and respect or even admiration on the part of the interviewer and interviewee."[95] This involves consideration of the person being interviewed, good manners, a firm handshake, a friendly word of greeting, and clarity of expression. If the teacher can provide that rapport for the students, they will have more success on their project.

All arrangements for transportation and interviewing appointments can be made by the students under the direction of the teacher. When the students are unable to produce the

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[94]Esther G. Smith, "Reporting as a Means of Vocational Guidance," School Activities, 15:61, October, 1943.

[95]James E. Bender, "How's Your Interviewing Technique," Occupations, 22:299, February, 1944.

names of persons to be interviewed, it is advisable for the teacher and pupils to cooperate in building up a list of willing individuals in the community.

This interviewing technique can be correlated with the small group visiting activity to conserve time, but to get the fullest effect, interviewing should be conducted separately. This activity has much value as a motivating force for slow students because of its uniqueness and because of certain important factors involved.

The slow student will enjoy this activity because the task is definite, and with a firm preparation, he will feel confident. This advantage is even greater when the student is familiar with the person to be interviewed. At the Mesa Union High School of Mesa, Arizona, students were studying the early history and life of their community.[96] These students approached their parents and grandparents in their search for information. The results were excellent, and on the basis of information thus obtained, related activities of drawing, map making, and collecting pictures were introduced. These students were working in an element which was familiar and real to them; they were capable of getting desired results for their efforts.

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[96]Theodore Young, "An English Class Explores the Community," Education, 63 :639-644, June, 1943.

There is another important appeal to the slow students. The value of the preparation is made real; the students can appreciate the importance of poise when approaching people for an interview. At the Oak School, La Grange, Illinois, a group of eighth grade students took advantage of the Sunday Evening Club of the American Legion.[97] Since famous personages were guest speakers, the students decided to conduct a series of interviews which would be reported to the class. The students made the necessary arrangements, completed the interviews and reported as planned. As their teacher states:

> The poise developed, the inspiration received, and the responsibility exercised are immeasurable. The desire for social approval inspired the children to speak well before the famous person visiting the community. Since the student realizes that he has been granted the interview when his classmates desired the privilege, it becomes imperative for him to report his experience in an effective manner.[98]

The author would like to stress the last part of this statement by the teacher. Here under the impetus of a mild form of rivalry, the slow students will be motivated to do a good job. They will receive social approval for a worthwhile undertaking which can inspire them to do better work in social studies.

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[97]Alta McAfee, "Interviews with Celebrated Persons Motivate English," English Journal, 31:232-235, March, 1942.

[98]Ibid. p. 233.

Interest is provided for in this interviewing activity because the material studied in school can be related to the home and community. H. Memler tells of the project her students carried out in the Community High School, Perkins, Illinois.[99] The community study was directed toward gathering information from the older residents in the community. The students wanted a firsthand acquaintance with the local officials. Memler states that:

> Other achievable objectives held for our course in Beginning Civics are the development of a technique of interviewing people to get desired information, the ability to put the findings on paper in note or essay form, and the ability to transmit the information orally to other people.[100]

This objective is concrete and attainable through the interviewing activity. Therefore some interest can be maintained because the work is varied, based on personal contacts, and of personal value to the student. Recognition will be provided because the student is reporting on an experience which is his own. The social prestige accompanying this interviewing and reporting can be successful as a method of motivating the slow student.

The students and the class will benefit greatly because a non-member will be inspired to participate. As a corollary

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[99]Henrietta Memler and Wayne Alvord, "Study Your Town," Social Education, 10:311-313, November, 1946.

[100]Ibid. p. 313.

to this, the contribution of firsthand information from a classmate will increase the amount of knowledge of the class as well as providing an interesting sidelight to the class studies.

CHAPTER III

A UNIT ON MINING

This chapter contains a unit which was organized, and taught by the author. The methods and materials of Chapter II were used in the teaching of this unit, and the results were good. This unit was originally organized for use in a seventh grade group at the Bigelow Junior High School of Newton, Massachusetts, in the Spring of 1947. Since that time, it has been reorganized for use in another seventh grade group in the Fall of 1947. The original unit was rewritten to meet the needs of the students and to adjust it to the conditions of the time that the unit was taught.

More than one hundred and ninety students were involved in the study of this unit on mining. Since they were grouped homogeneously, there was a wide range of abilities and interests. The author believes that the unit should be included in this thesis since it has been proven successful in actual classroom use.

The following explanation of the code used to indicate the textbooks to be used by the students to answer the questions and problems is inserted here. The first number which is followed by a colon (:) represents the text or reference book which is found in the students' bibliography. This is followed by the numbered pages of the book. The dash (-) between the pages signifies that the related information

may be found on all of these pages. A comma (,) signifies separate pages, and a semi-colon (;) is the end of the reference to be found in any one book.

(8:209; 10:257-276)

8 = Meyer, page 209

10 = Rugg, pages 257 to 276.

The above code is used throughout the section of questions and problems.

THE UNIT

The mining industry is essential to the rapid and continued growth of our present mode of life. The products of this industry have affected our daily activities as well as the industrial potential of the various nations of the world. It is from these materials which are extracted from the earth's crust that we are provided with the raw materials from which we manufacture the essential products which play an essential role in the improvement of living conditions. These raw materials also provide the military strength of nations. Therefore, by implication, it is necessary for people to know about the mining industry.

DELIMITATION OF THE UNIT

1. With the improvement of methods of extracting minerals from the earth's crust, more materials have been available at a lower cost to the consumers, and as a result, we

have a higher standard of living.

2. The economic strength of nations is dependent upon the minerals available to them: the growth of societies is directly connected with these mineral deposits, and the unequal distribution has been the basis of many conflicts.
3. Management, labor, and consumer are dependent upon the richness of the ore, the nearness of markets, and a reasonably cheap means of transportation.
4. To fully utilize the minerals available, there must be a high degree of cooperation between management and labor in order to maintain a constant flow of supplies.
5. Due to the increased complexity of life as a result of industrialization many subsidiary industries have been created to produce the by-products of the mining industry.
6. Since we are all potential consumers of the products of the mining industry, we should understand the many ramifications of this industry and their implications for us.
7. Man is dependent upon the fuels which were a product of the sun's energy, because they are the source of energy which turn the wheels of all our industries.
8. Steel as the basic material for all our present day industries has provided us with the means of achieving a high development of our society.
9. Precious metals are known as such because man has fixed a certain value on them, because their unusual properties

give them special uses, and because they are rarely found in nature.

10. The future supply of the mineral sources of the earth are dependent upon the conservation of them, the improvement of methods of extraction, and a greater use of the waste products which result from purification.

OUTLINE OF CONTENT

I. The relationship between the history of man and the extraction of minerals
   - A. The development of bronze in the Mediterranean area
   - B. The increased use of fuels to improve man's living conditions
   - C. The improvement of mining methods through the centuries
     1. The discovery of new methods
     2. The cooperation of science and industry
     3. The advancement of technical skills

II. The importance of the location of minerals in the growth of nations
   - A. Abundant supplies and the development of mining
   - B. The improvement of transportation and communications
     1. The tapping of inaccessible areas
     2. The availability of more minerals
   - C. The condition of the area and the type of mining
     1. Open-pit mining

2. Shaft mining

3. Placer mining

III. Three factors govern the value of mineral deposits

A. The richness of the deposit

1. The Mesabi Range

2. The soft coal of Pennsylvania

B. The nearness to cheap transportation

1. The Mesabi Range

2. The cement plants in New York State

3. The soft coal in West Virginia

C. The availability to nearby markets

1. Granite quarries in New Hampshire

2. Anthracite coal in Pennsylvania

3. The soft coal mines in Illinois

IV. The interdependence of management and labor

A. The responsibilities of management

1. The maintainance of good working conditions

2. The provision for the improvement of the employee's living conditions

B. The demands of the manager

1. A profit for incentive and reinvestment

2. A minimum turnover in labor

3. A reasonable market

C. The responsibilities of labor

1. The maintainance of a high degree of skill

2. The maintainance of stability in production

D. The demands of labor

1. A certain degree of security

2. Good, safe working conditions

3. Some profit as an incentive

V. The methods of converting raw materials to the useable products

A. The conversion of coal

1. The separation from slate

2. The production of fuel gas

3. The use of coal in producing power

B. The distillation of oil

1. The complexity of the process

2. The various by-products

C. The smelting of ores

1. The blast furnace

2. The open hearth process

3. The conversion of lead, zinc, etc.

D. The use of the products of conversion

1. Fuels in everyday life

2. In industry

3. In transportation and communication

4. As export in international trade

VI. The importance of minerals to us as consumers

A. Knowledge of the source of our minerals

B. Knowledge of the properties of various minerals

1. Steel for trains, ships, automobiles

2. Copper, silver, and platinum for wiring and radio communications
3. Aluminum and magnesium for use in household utensils and airplanes
4. Coal as a source of fuel for the production of heat, electricity and locomotion

VII. The dependence of industries upon fuels
- A. The use of coal
  1. The use of coal in the railroad
  2. The use of coal in manufacturing plants
  3. The use of coal for the production of gas
- B. The use of oil
  1. As a source of power
  2. As a source of lubrication
  3. As a source of heat

VIII. The dependence of man upon the production of steel
- A. Use in the making of machinery
- B. Use in the construction of buildings
- C. Use in the materials of our everyday life
  1. In the school
  2. In the home
  3. In the community

IX. The precious minerals
- A. Diamonds: properties and value
  1. In industry
  2. In the making of jewelry

B. Platinum: properties and value

1. In the making of precision instruments

2. In the making of wire

3. In the making of jewelry

C. Gold and Silver: properties and value

1. In the backing of currency

2. In the making of jewelry

D. The location and mining of precious minerals

X. The future supply of minerals

A. The conservation

B. The improvement of the methods of extraction

1. The greater use of machines

2. The avoidance of waste

C. The use of waste products

1. The use of coal waste

2. The better purification of oil

3 .The reclamation of old minerals

LIST OF READINGS AND MATERIAL FOR THE TEACHER

Textbooks

1. Chase, Stuart and Schlink, F. J., Your Money's Worth, New York: Macmillan Company, 1927.

2. _____, The Tragedy of Waste, New York: Macmillan Company, 1928.

3. Fisher, Elizabeth, Resources and Industries of the United States, Boston: Ginn and Company, 1928.

4. Gordon, Leland J., Economics for Consumers, New York: American Book Company, 1939.

5. Jacobson, Dorothy H., Our Interests as Consumers, New York: Harper and Brothers, 1941.

6. Parkins, A. E. and Whitaker, J. R., Our National Resources and Their Conservation, New York: John Wiley and Sons, 1936.

7. Read, Thomas T., Our Mineral Civilization, Baltimore: Williams and Wilkins Company, 1932.

8. United States Bureau of Mines Mineral Yearbook, Washington: United States Printing Office, 1934.

9. Zimmermann, Erich W., World Resources and Industries, New York: Harper and Brothers, 1933.

Magazine Articles and Pamphlets

1. Barlte, Glen G., Ekblaw, Sidney E., Hilken, Henry G., "Conservation of our Fuel Resources" Journal of Geography 39:274-280, 1940.

2. Blanchard, W. O., "Magnesium--The Metal for Motion" Journal of Geography 47:31-36, January, 1948.

3. Bunn, Harriet, "Mining," (Unit Study book No. 654) New York: American Education Press.

4. Crisler, Robert M., "The Aluminumware Industry of Washington County, Wisconsin," Journal of Geography, 46:247-257, October, 1947.

5. Grady, R. A. "Coal Tar Skeptic" America. 65:692, September, 1941.

6. James, Preston E., "Developments in the Field of Geography and Their Implications for the Geography Curriculum," Journal of Geography 46:221-229, September, 1947.

7. Reitz, William W., "Teaching Resources Conservation Thru Geography," Journal of Geography 46:227-234, September, 1947.

Workbooks

1. McConnell, W. R., Geography Workshop, Geography of the Americas, Chicago: Rand McNally, 1946.

INDIRECT LEARNING PRODUCTS

A. Appreciation: (1) toward our dependence upon the mining industry for our present high standard of living, (2) toward the tremendous advance in mining methods, (3) toward the future growth of the mining industry, (4) toward the value of the conservation of the mineral resources.

B. Attitudes: (1) for the promotion of a better understanding of the problems of miners and operators, (2) for careful consumption of manufactured products, (3) for intelligent thinking toward better use of minerals, (4) for wider interest in the mineral deposits of the United States and the world.

C. Skills: (1) in pooling and sharing of information with the members of the class, (2) in efficiently utilizing the time available during the laboratory phase, (3) in

the use of reference books, texts, and other sources of information, (4) in the mastery of facts and problem-solving thinking for use when considering the present day world conditions.

D. These Appreciations, Attitudes, and Skills should be integrated with the essential understandings to provoke a modification of the students' behavior.

UNIT ASSIGNMENT

A. Introduction Start a class discussion about the importance of materials extracted from the earth's crust, and how they affect our daily lives. The class begins by pointing out those manufactured products in the classroom which have been made from the raw materials produced by the mining industry. The discussion is centralized on the following questions: (1) How important to our classroom activities are the metals and non-metals in the room? (2) What would be the result if we were deprived of these materials? (3) What materials found in the home are helpful in maintaining our high standard of living? (5) How can our consumer knowledge be broadened by understanding the processes of extracting, converting and manufacturing certain materials? (6) Where and how will the production of raw materials affect our daily lives? Along with the above points, the following will be considered: (1) Mining is carried on in many areas of the United States and the

world. (2) As one of our basic industries, mining will have an effect on the economy of the country. If the manufacturers are not provided with raw materials and fuels, the whole industrial program comes to a standstill. (3) We can obtain information about mining from the industries; the business establishments of the community; the newspapers, magazines, libraries, the radio, motion pictures, fiction books; and the personal experience of our parents and friends. The discussion will be concluded with some teacher-pupil pretesting and planning for the execution of the unit. The following topics should be considered in this planning: (1) the location and types of mines, (2) the history of metals and their use by man, (3) the value of deposits, (4) the owners and workers of the industry, (5) the conversion of raw materials, (6) the importance of minerals to consumers, (7) the essential fuels, (8) the materials used for construction, (9) the precious minerals, (10) the future supply of minerals.

B. Questions and Problems.

1. Are there any materials which are mined near or in Massachusetts? Where are these deposits located? 1:33; 2:141; 5:83; 13:188.
2. What are the locations of most mineral deposits in the United States? Where in the world can we find the essential materials which are used in our daily lives? 1:62-64; 2:141, 210, 211; 3:213, 217, 219; 4:51;

8:360; 9:104; 12:215; 13:63-66.

3. What geographical factors influence the location of important mineral deposits of the United States?
   1:166, 177; 3:219, 224; 5:169; 6:155; 13:46.
4. When you consider the location of the Mesabi Mine (Hibbing, Minnesota) what influence does the age of the land have on that mine?
   1:150; 4:51; 5:143; 11:171.
5. What types of mining would be used for extracting materials which are located at various depths below the earth's surface?
   1:64, 107, 177; 5:103; 12:209; 13:63-66.
6. Why can the hydraulic method be used for the mining of gold in the Yukon territory of North America?
   1:206, 271; 5:168; 13:46.
7. What is the difference in rock structure which has caused the coal in Virginia to be mined by strip and stope methods, whereas in Pennsylvania, they do shaft mining?
   1:62, 66, 67; 3:220; 4:52; 5:81; 8:207; 11:150; 12:219, 221; 13:136-137, 186.
8. Since the iron ore in the Lake Superior area is close to the surface, what type of mining will be used? What are the advantages of this type over shaft mining?
   1:150; 3:207; 9:164; 12:208.

9. By using the Great Lakes region as an example, show how transportation is closely allied to the mining industry.
   1:23, 149, 150; 2:141; 3:221; 7:113: 10:342-346; 12:213; 13:74.
10. What influence will power have on the location and the value of deposits? Use Pittsburgh as an example.
   1:71, 136; 3:247; 5:93; 7:113; 8:209; 10:257-276; 11:154; 12:300-301; 14:584-586.
11. What effect does a large home market have upon the high level of the mining industry?
   1:20,68; 7:113; 14:577, 596.
12. Why would material mined in remote areas be more expensive than that which is mined close to an area of dense population and good transportation?
   1:162, 166, 167; 3:256; 8:364; 11:88, 89; 12:233.
13. What advantage does the mine operator have when he maintains good equipment and provides for the safety of his employees?
   1:20; 12:206-207, 209.
14. What results does the owner achieve when he improves the living conditions and the provision for the children of the miners he employs?
   3:256; 10:351-367; 13:66.
15. Why must the mine operators make a profit from the

operation of their holdings?

12:206; 14:583, 594.

16. Why must the employees maintain a high degree of skill in their mining techniques?

3:255; 12:207; 14:575.

17. What causes the interdependence of the miners and the operators?

3:269, 270; 7:113; 12:207; 14:583.

18. How do climate and immigration help to provide the type of workers which can develop important skills and produce in the mining industry?

3:255; 7:113; 8:210; 12:294-296, 297-300; 13:138, 139; 14:594.

19. How does the technical improvement of equipment (through scientific research) make deposits more valuable?

6:158; 8:362; 9:156; 12:203-205, 209, 233.

20. What is usually done with the mineral as soon as it is brought from the mine? Use the coal mines of Pennsylvania as an example.

1:68; 3:206; 7:115.

21. How is the mineral moved from the mines to the places where it is converted? Describe two of the most common methods and compare them.

1:149; 3:206, 247; 14:590-591.

22. Why are the converting plants so closely connected to the mining industry?

1:63, 69, 97, 136; 3:222; 9:130; 12:206, 209, 274-277; 13:210-212.

23. What other minerals are used in the purification of the essential minerals? How are these purifying minerals used?
3:216; 9:161; 11:147; 13:63.

24. How is waste prevented in the refining of petroleum or the making of coke?
1:68, 90, 97; 3:222, 224; 4:82, 83; 9:110; 12:214; 13:187.

25. Why do the refining plants make the value of petroleum high and make it profitable to extract the oil?
1:68, 90; 3:224; 8:363; 12:227.

26. What is a blast furnace? What are the purposes of using limestone and coke in the blast furnace?
4:55; 12:211, 213; 14:580.

27. Why is it that most of the metals which are commonly used are some type of alloy? What are the advantages of an alloy over a pure metal?
7:114; 14:397.

28. What connection is there between the properties of a mineral and its use?
3:215; 9:20; 12:208, 232; 14:597.

29. How can you, as a consumer, do a better job of buying and what will be the basis of your purchases?
2:53; 3:220; 6:166; 12:237; 14:578-583.

30. How can your knowledge of the various minerals and their properties give you a better understanding of their importance to you?
    1:90, 193; 3:213, 214; 13:138; 14:578-583.
31. How has the cheap production of light metals (aluminum and magnesium) affected the growth of one phase of transportation?
    1:101; 3:215; 6:167; 12:237.
32. What are the properties of anthracite, bituminous, and lighite which determine their uses as fuels?
    3:220, 250; 5:144; 6:168-171; 9:101; 12:222; 14:586.
33. What uses of coal, petroleum, or natural gas make them more valuable than the commonly known precious metals such as gold, silver or platinum?
    3:220, 224, 251; 5:181; 7:156; 12:230; 14:587.
34. What conditions exist in the earth where oil is found? What were the geological conditions which brought about the formation of oil?
    1:87; 3:224; 6:172; 9:122, 125, 128; 12:226.
35. Why is natural gas used by those communities which are close to the oil fields? Why do we use manufactured gas in New England?
    1:136; 3:224; 4:54; 6:174; 12:230; 14:588.
36. Why is steel considered the basic material upon which our industrial strength is built?
    3:212, 257; 4:56; 9:15; 9:155; 10:285-304; 12:212; 14:597.

37. How did the Bessemer process change the uses of steel?
    3:207, 257; 6:160; 9:158; 12:213; 14:597.
38. Why are diamonds used more in industry than in the making of jewelry?
    3:213.
39. For what use is the tremendous demand for copper, silver and platinum in our communications industries?
    3:213, 217; 5:125, 145; 6:164, 166; 12:232, 235; 13:189.
40. What factors make certain materials precious? Why is gold considered to be an indication of the wealth of a nation?
    1:187; 3:216; 6:164; 11:83; 12:234.
41. Why does man consider such materials as emeralds, saphires, and rubies as valuable?
    3:218.
42. How long will our present supply of minerals last? What can the mining industry do to conserve this supply?
    3:222, 223; 6:159; 9:113, 116, 135; 11:151; 12:209, 222, 229.
43. What are some of the non-metals which are used in large quantities and which provide much toward our high standard of living?
    1:63; 3:224; 4:56; 5:83, 181; 12:239-242; 14:588.
44. Why is man always trying to find new materials in the earth or trying to find new deposits of those already

known?

2:141; 3:205, 213; 4:53; 5:83; 7:114; 11:89.

45. Why are the conveniences of our future life dependent upon the production and development of the mining industry?

2:141; 3:212, 219, 222; 7:122; 9:99-100, 162; 12:212; 14:575.

46. In the light of the information you have obtained, what is the importance of the mining industry to you?

C. Optional related activities The following activities are suggested for use in getting a better understanding of this unit in mining.

1. Select certain materials used in the classroom (chalk, steel, glass, brass, etc.), and show where these materials are obtained.
2. Make a map showing the location of oil, coal, iron and copper in the United States.
3. Construct a model out of clay showing how the earth's crust is folded and bent as it is in the anthracite fields of Pennsylvania.
4. Make a three dimensional model showing the connection between the Mesabi Range and Pittsburgh.
5. Make a collection of the various types of coal and use them in a demonstrated talk.
6. Devise some method of demonstrating the effect of water pressure on earth. This can be used to explain hydraulic

mining to the class.

7. Make an investigation in reference books for information on rock structures. Make a report to the class.
8. Construct a model of open-pit mining for use in class.
9. Draw a chart showing how oil is drilled and the type of equipment used. Use this chart in making an oral report.
10. Consult with your teacher for information on mining movies. Make arrangements for their procurement and use in the class.
11. Dress up a doll in the clothing and equipment used by miners.
12. Bring in some model trains which have that equipment which is used to transport ores. If you haven't any models, make some for class demonstration.
13. Visit a freight yard in your vicinity. Investigate and relate your experiences to the class.
14. In some of the local newspapers there are notices of ships that are entering and leaving Boston Harbor. Make a list of all the different types of materials that pass through this port.
15. Prepare an illustrated talk showing the differences between our present day tools for mining and those of the past.
16. Invite several of your classmates to join you in investigating the safety devices used in coal mining.

The class will be interested in your report.

17. Living conditions of miners are important. Make some drawings or charts which would help your classmates to understand these conditions.
18. Organize a clipping service which will contain newspaper articles which are related to mining. Post them on the bulletin board.
19. Record the temperature readings of cities located near mining areas. Use these figures for a report on the climatic conditions in mining areas of the United States.
20. Construct a model of the Sault Ste. Marie Canal to show your classmates how this canal helps in transporting material through the Great Lakes.
21. Make a topography map or a model of the Great Lakes region to explain the connection between Duluth and Pittsburgh.
22. Form a small committee which will find out how the soft coal of the Pittsburgh area is used in the making of pig iron.
23. List the many uses of concrete in a city such as New York. Using this list, show how the cement produced in New York State has a ready home market which makes cement production profitable.
24. Locate Bisbee, Colorado, on a map and show how it is remote from transportation. Show how this effects the

living conditions of the miners.

25. Around Boston there are numerous chemical laboratories. Visit some of them to find out what they are doing to help the mining industry.

26. Write to some of the addresses listed below for information on the mining industry and the use of mineral products.

(a) American Brass Company
Waterbury 88, Connecticut.

(b) American Iron and Steel Institute
350 Fifth Avenue
New York, New York.

(c) American Petroleum Institute
50 West 50th Street
New York 20, New York.

(d) Bituminous Coal Institute
815 Southern Building
Washington 5, D. C.

(e) British Information Service
30 Rockefeller Plaza
New York, New York.

(f) Cleveland-Cliffs Iron Company
Cleveland, Ohio.

(g) Delaware, Lackawanna and Western Coal Company
120 Broadway
New York, New York.

(h) International Silver Company
Meriden, Connecticut.

(i) Lehigh Navigation Coal Company
Philadelphia, Pennsylvania.

(j) National Lead Company
111 Broadway
New York, New York.

(k) New England Coal and Coke Company
250 Stuart Street,
Boston, Massachusetts.

(l) Pan American Union
Washington, D. C.

(m) Pittsburgh Steel Company
Pittsburgh, Pennsylvania.

(n) Pittston Company
Empire State Building
New York 1, New York.

(O) Standard of California
225 Bush Street
San Francisco 20, California.

(p) Standard Oil Company (New Jersey)
30 Rockefeller Plaza
New York 20, New York.

27. Send a letter to the United States Bureau of Mines, Washington, D.C. It will send you some information on the industries which convert the raw materials.
28. Make a trip to one of the gasoline stations in your neighborhood. List all of the products which come from petroleum.
29. If there is a fuel oil company near your home, interview the owner to obtain information on the types of fuel he handles. The class will be interested in your findings.
30. At the Jamaica Plains Childrens Museum there are exhibits of coal products. Contact the museum and obtain an exhibit for use in the classroom.
31. Make a survey of the students of the seventh grade to see what percentages of the class have oil, coal or illuminating gas in their homes.
32. Procure a piece of copper wire, a piece of water pipe, the filament of a light bulb, and a piece of cast iron. Use these articles to demonstrate to the class how the properties of metals determine their use.
33. If there is a coal company in the vicinity of the school, go to see the operator. He will be glad to tell you about the business. Procure some samples to show to the class.
34. Organize a small group of your classmates to visit the local gas works to see it in operation. Then make a

report to the class.

35. Make a list of the types of machinery which would be made out of steel.

36. Ask the Practical Arts teacher to permit you to make a survey of the machines and tools in the shop. Make a list of these and show how some of them are used.

37. Arrange a visit to the New England Telephone Company to observe the operations. Explain to the class how copper, platinum, and silver are used in this industry.

38. Some minerals are used for fertilizer on the farm. Make a trip to the country or contact the State agricultural department for information.

39. At home there are utensils which are galvanized. Investigate the zinc mining industry to see how this galvanizing material is obtained.

40. Read the biography of Bessemer to see how he developed the converter and to see its effect on the steel industry.

41. Interest some of your classmates in interviewing some of the local jewelers to get some information on the use of valuable stones.

42. Investigate in the World Almanac to see how much gold the United States has in storage. Show how our dollars are dependent upon this gold.

43. Madame Curie is famous for her work with radium. Organize some of your classmates into a dramatic club

in which you will dramatize the life of this famous scientist.

44. Visit the boiler room of this school to see how soft coal is used to heat the building. The engineer will give you much information.
45. Show the class what items of clothing or personal effects are made from metals.
46. Write a composition telling your ideas on the way in which metals can improve our future living conditions.
47. If you have any activities which are not listed above, consult with your teacher so that you may have his help in completing your project.

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List of Textbooks - The following list is for Pupils' use to which they may refer for proper references to above problems.

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Supplementary Reading Books - The following list of books can be used to supplement the reading of the textbooks.

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Supplementary Pamphlets - The following list of pamphlets can be used to supplement the reading of the textbooks.

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3. Bethlehem Steel Company, Steel in the Making, A pamphlet; Bethlehem, Pennsylvania, The Company, 1942.
4. Copper and Brass Research Association, Safeguard Your Home, A pamphlet; New York: The Company, 1946.
5. Cumley, Russell W., American Oil, A pamphlet; Evanston, Illinois: Row Peterson, 1942.
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Tentative Time Schedule - This unit will require about four weeks time.

First period- - - - - Introductory phase (handing out guide sheet)

Second period - - - - Continue introduction (Teacher-pupil planning)

Third period- - - - - Laboratory phase

Fourth period - - - - Laboratory phase

Fifth period- - - - - Laboratory phase

Sixth period- - - - - Laboratory phase

Seventh period- - - - Laboratory phase

Eighth period - - - - Laboratory phase

Ninth period- - - - - Laboratory phase

Tenth period- - - - - Laboratory phase

Eleventh period - - - Pooling and sharing of experience phase

Twelfth period- - - - Pooling and sharing of experience phase

Thirteenth period - - Pooling and sharing of experience phase

Fourteenth period - - Pooling and sharing of experience phase

Fifteenth period- - - Pooling and sharing of experience phase

Sixteenth period- - - Pooling and sharing of experience phase

Seventeenth period- - Pooling and sharing of experience phase

Eighteenth period - - Pooling and sharing of experience phase

Nineteenth period - - Pooling and sharing of experience phase

Twentieth period- - - Achievement Test (for estimating educational growth)

ACHIEVEMENT TEST

I. Multiple-choice type - In the space provided at the right, place the letter which makes the statements correct. Each statement should be read carefully before the choice is made. Study the example given below before answering the statements which follow.

0. Peat is usually found in:

(a) dry land.

(b) mountains.

(c) wet, marshy land. (c)

1. Shaft mining is used when the minerals are:

(a) on the surface.

(b) deep in the earth.

(c) under water. (___)

2. The type of coal used in making coke is:

(a) bituminous.

(b) anthracite.

(c) Lignite (___)

3. Iron is a:

(a) fuel.

(b) alloy.

(c) metal. (___)

4. Minerals are called precious because they:

(a) have the same properties as gold.

(b) are difficult to obtain.

(c) are found in remote places. (___)

5. The material which is often found with oil is:

   (a) sulphur.

   (b) natural gas.

   (c) coal. (___)

6. The value of deposits depends upon the:

   (a) transportation available.

   (b) cost of machinery.

   (c) water pressure available. (___)

7. Most of the world's diamond supply comes from:

   (a) Asia.

   (b) Canada.

   (c) Africa. (___)

8. The material left when the iron is taken from the ore is known as:

   (a) slag.

   (b) coke.

   (c) limestone. (___)

9. The two classes of minerals are:

   (a) metal and compound.

   (b) gold and alloy.

   (c) metallic and non-metallic. (___)

10. The nation which produces the most silver is:

   (a) Canada.

   (b) Mexico.

   (c) the United States. (___)

11. When Marco Polo reported that people burned black stones, he was in:

    (a) Japan.

    (b) Egypt.

    (c) China. (___)

12. Mining with water pressure is known as:

    (a) hydrostatic.

    (b) hydraulic.

    (c) hydramatic. (___)

13. A crushing mill is a place where:

    (a) impurities are separated from the ore.

    (b) concentrates are produced.

    (c) iron ore is purified. (___)

14. The camera film companies are big users of:

    (a) silver.

    (b) gold.

    (c) copper. (___)

15. Before World War II, the Mesabi Range produced Iron ore at the annual rate of:

    (a) 50,000,000 tons.

    (b) 60,000,000 tons.

    (c) 70,000,000 tons. (___)

16. In the coal fields of West Virginia, the rocks are:

    (a) folded and bent.

    (b) in layers.

    (c) loosely held together. (___)

17. Petrolatum is another term for:

    (a) petrol.

    (b) industrial alchohol.

    (c) petroleum jelly. (___)

18. When copper is mixed with tin, the resulting metal is found to be:

    (a) harder than either one.

    (b) softer than either one.

    (c) as hard as both of them by themselves. (___)

19. After looking at the regions where minerals are found in the world, it can be seen that they are usually found in:

    (a) crowded areas.

    (b) deserted areas.

    (c) mountainous areas. (___)

20. The first people to combine copper and tin came from:

    (a) the Mediterranean area.

    (b) the Red Sea area.

    (c) the Caspian Sea area.

21. Of the many problems which the mine operator has, one of the most important of them is concerned with:

    (a) advertising his product.

    (b) maintaining good working conditions.

    (c) stocking the mineral. (___)

22. The Sault Ste. Marie connects:

(a) Lakes Superior and Michigan.

(b) Lakes Superior and Huron.

(c) Lakes Huron and Erie. (___)

23. Minerals are practically useless without:

(a) a reputation.

(b) some means of getting them into a pure form.

(c) a nearby market. (___)

24. When owners go into the mining business, they must make:

(a) a profit.

(b) Laws for the control of the company.

(c) highways to the plants. (___)

25. Gold is often found with:

(a) silver, iron and lead.

(b) zinc, copper, and chromium.

(c) lead, copper, and silver. (___)

26. To maintain a high level of production, the employees of a mining company must:

(a) have a fifty hour week.

(b) have a high degree of skill.

(c) know the complete process of mining. (___)

27. Industries depend upon a constant supply of fuel because:

(a) it is necessary to heat the plants in the winter.

(b) it is the raw material from which products are made.

(c) it is essential for power. (___)

28. The supply of minerals can be conserved by:

(a) using machines as long as they will hold up.

(b) reclaiming old minerals.

(c) mining less than is needed for consumption.(___)

29. Diamonds are valuable to man because they are:

(a) most useful in industry.

(b) used in jewelry.

(c) the basis for our money.

30. Minerals are useful to man because:

(a) of their properties.

(b) they are easily extracted from the earth.

(c) they are used in the making of machines. (___)

II. Reverse Multiple-choice type - In the space provided at the right, place the letter of the answer which is incorrect. Each answer should be carefully considered before a choice is made. Study the example given below before answering the questions which follow.

00. The most important minerals used to heat homes are:

(a) oil.

(b) lignite.

(c) coal. (_b_)

31. Coal can be the source of:

(a) heat.

(b) insulation.

(c) tar. (___)

32. Some of the properties of platinum are:

(a) a low melting point.

(b) ductility.

(c) strength. (___)

33. Minerals are worthless without:

(a) available transportation.

(b) a nearby market.

(c) water power. (___)

34. Some types of coal are considered to be of low value because they:

(a) contain too much water.

(b) are found in accessible areas.

(c) do not contain enough carbon. (___)

35. The force that causes oil gushers is:

(a) a natural force.

(b) nitro-glycerine.

(c) natural gas. (___)

36. The Lake Superior area is important for the production of iron ore because:

(a) the ore is rich.

(b) the United States government buys it.

(c) the deposits can be easily mined. (___)

37. Since electrical power is needed for the refinement of bauxite, many such plants are found in:

(a) Niagara Falls.

(b) Alcoa, Tennessee.

(c) Shasta, Washington. (___)

38. Lead is used in our daily lives for:

(a) galvanizing iron and steel.

(b) covering cables.

(c) protecting food. (___)

39. Swedish steel, which is refined with charcoal, is useful for:

(a) surgical instruments.

(b) structural steel.

(c) the cutlery industry. (___)

40. The large shipping ports near the Mesabi Range are:

(a) Duluth.

(b) Superior.

(c) Detroit. (___)

41. German Silver is:

(a) a combination of zinc, copper and nickel.

(b) an alloy.

(c) a type of silver mined in Germany. (___)

42. When a mineral is converted, it is:

(a) carefully weighed.

(b) separated from other materials.

(c) purified. (___)

43. Anthracite coal is found in:

(a) veins which run from inches to several feet in thickness.

(b) isolated pockets.

(c) seams which do not lie flat. (___)

44. The properties of copper make it a useful metal in the communications industries because:

(a) it is one of the hardest minerals.

(b) it is a good conductor of electricity.

(c) it is ductile. (___)

45. The large deposits of Lignite in Montana are not used very much because:

(a) they are in a remote area.

(b) the lignite is difficult to mine.

(c) the American industries have a better source of fuel. (___)

46. Petroleum is broken down into the various by-products through:

(a) a distillation process.

(b) the application of heat.

(c) the application of thousands of pounds of pressure. (___)

47. Plants which manufacture the mined materials are found in the cooler climates because:

(a) better working conditions are available.

(b) there are large centers of population in this type of climate.

(c) the minerals are located in that type of climate. (___)

48. When there is an excess of mined minerals, the over-supply should be:

(a) destroyed to save the cost of storage.

(b) stored for future use.

(c) exported. (___)

49. Steel is widely used in the world because it:

(a) can be made in large quantities at a reasonable cost.

(b) has many useful properties.

(c) can be transported cheaply. (___)

50. The methods of extracting and using minerals can be improved:

(a) through the help of science.

(b) by getting more people to work in the mines.

(c) by the use of waste materials. (___)

III. Matching type - In the space provided at the left hand column, write the letter of the correct answer which corresponds to that item on the left.

____	51. Stope	(a) A process of reclaiming old steel.
____	52. Peat	(b) Mining coal from an excavation underground.
____	53. Bessemer	(c) 300 years supply of coal.
____	54. Open-pit	(d) Poor man's fuel.

____ 55. Drake	(e) The process of extracting a mineral from its ore.
____ 56. Big Horn Mountain	(f) The inventor of a process of smelting.
____ 57. Anthracite	(g) The first oil well in Pennsylvania.
____ 58. Geologist	(h) Surface mining.
____ 59. Open hearth	(i) A person who studies rocks scientifically.
____ 60. Smelting	(j) A brown, poorly formed coal.
	(k) Sand to make molds.
	(l) Hard coal.

IV. True-False type - Circle the appropriate letter in the left hand column. If the statement is true, circle the (T). If it is false, circle the (F).

T F 61. Coke is coal that has been heated but not burned.

T F 62. Silver is a poor conductor of electricity.

T F 63. Placer panning is a method used for collecting coal from rivers and streams.

T F 64. Railroads use soft coal because it burns slowly and leaves a small amount of ashes.

T F 65. The heated air of the blast furnace is used over again to save fuel.

T F 66. Asbestos is mined in the State of Vermont.

T F 67. Aspirin is one of the by-products obtained when

petroleum is purified.

T F 68. When copper is smelted, the ore is crushed, roasted, treated with chemicals and separated from these chemicals by electricity.

T F 69. The United States produces enough tin for its own use.

T F 70. Salt is inexpensive because the cost of transportation is so low.

T F 71. Brass is an alloy of copper and zinc, with tin sometimes used.

T F 72. Coal is known and used by seventy-five percent of the world population.

T F 73. Aluminum and magnesium are useful because they are light and strong.

T F 74. The ease with which coal is mined in West Virginia is due to the condition of the rocks and erosion.

T F 75. The Union of South Africa produces more gold than the United States.

V. Essay type,- These questions should be answered completely and as precisely as possible. Use as many facts as you can to support what you say.

76. Explain why the Great Lakes have played such an important role in the development of the United States and why Duluth and Pittsburgh are important to one another.

77. Using coal and iron, show how the properties of minerals determine their use.

78. In order to maintain our high standard of living, we must have a steady supply of minerals. Explain three methods which will aid the conservation of minerals and help to maintain that supply.

APPENDIX

Key to Achievement Test for Unit Organization of the Topic on Mining, Chapter III.

I. Key to Multiple-choice Test.

1. (b)
2. (a)
3. (c)
4. (b)
5. (b)
6. (a)
7. (c)
8. (a)
9. (c)
10. (b)
11. (c)
12. (b)
13. (b)
14. (a)
15. (a)
16. (b)
17. (c)
18. (a)
19. (c)
20. (a)
21. (b)

22. (b)
23. (c)
24. (a)
25. (c)
26. (b)
27. (c)
28. (b)
29. (a)
30. (a)

II. Key to Reverse-Multiple-Choice type test.

31. (b)
32. (a)
33. (c)
34. (b)
35. (b)
36. (b)
37. (c)
38. (a)
39. (b)
40. (c)
41. (c)
42. (a)
43. (b)
44. (a)
45. (b)
46. (c)

47. (c)

48. (a)

49. (c)

50. (b)

III. Key to Matching type test.

51. (b)

52. (d)

53. (f)

54. (h)

55. (g)

56. (c)

57. (l)

58. (i)

59. (a)

60. (e)

IV. Key to the True-False type test.

61. T

62. F

63. F

64. F

65. T

66. T

67. F

68. T

69. F

70. F

71. T

72. F

73. T

74. T

75. T

V. Key to the basic elements of the Essay type test.

76. (a) The Mesabi range produces large quantities of rich iron ore, and Pittsburgh produces large quantities of bituminous coal which is necessary to convert the ore.

(b) Duluth (the Mesabi Range port) and Pittsburgh are connected by the Great Lakes which are a cheap means of transportation.

(c) The above points have combined to make the production of steel very reasonable.

(d) Therefore, since the industries of the United States are dependent on steel, they have the means to grow.

77.

Product	Properties	Use
(a) coal	1. Contains high percentage of carbon. 2. Burns readily 3. Provides steady heat.	1. Used as fuel. 2. Broken down into its by-products.

(b) Iron	1. Is reasonably strong.	1. For construction.
	2. Is raw material for making steel.	2. In industry
	3. Can be made into many alloys.	3. In the home
		4. For making our modern conveniences.

78. (a) The improvement of methods of extraction.

(b) The avoidance of waste.

(c) The reclamation of old minerals.

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